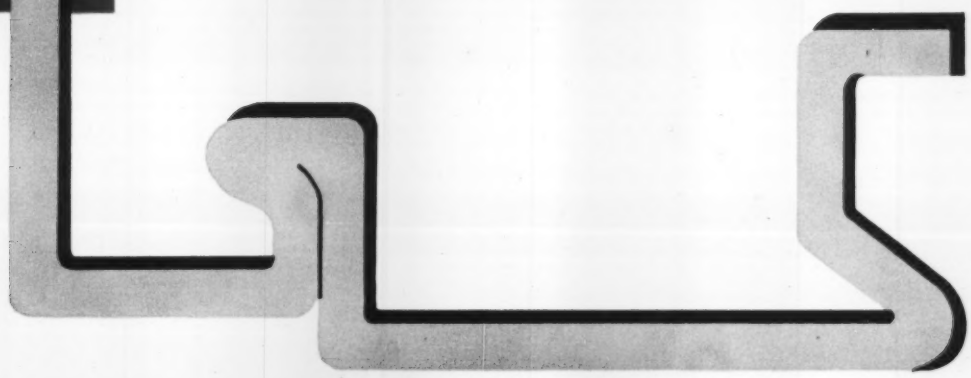
MARCH 4, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



production ideas

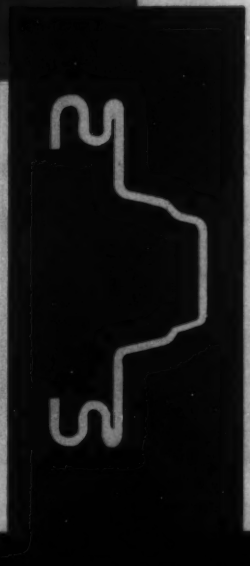
NO. 9 OF A SERIES

COLD ROLL FORMING

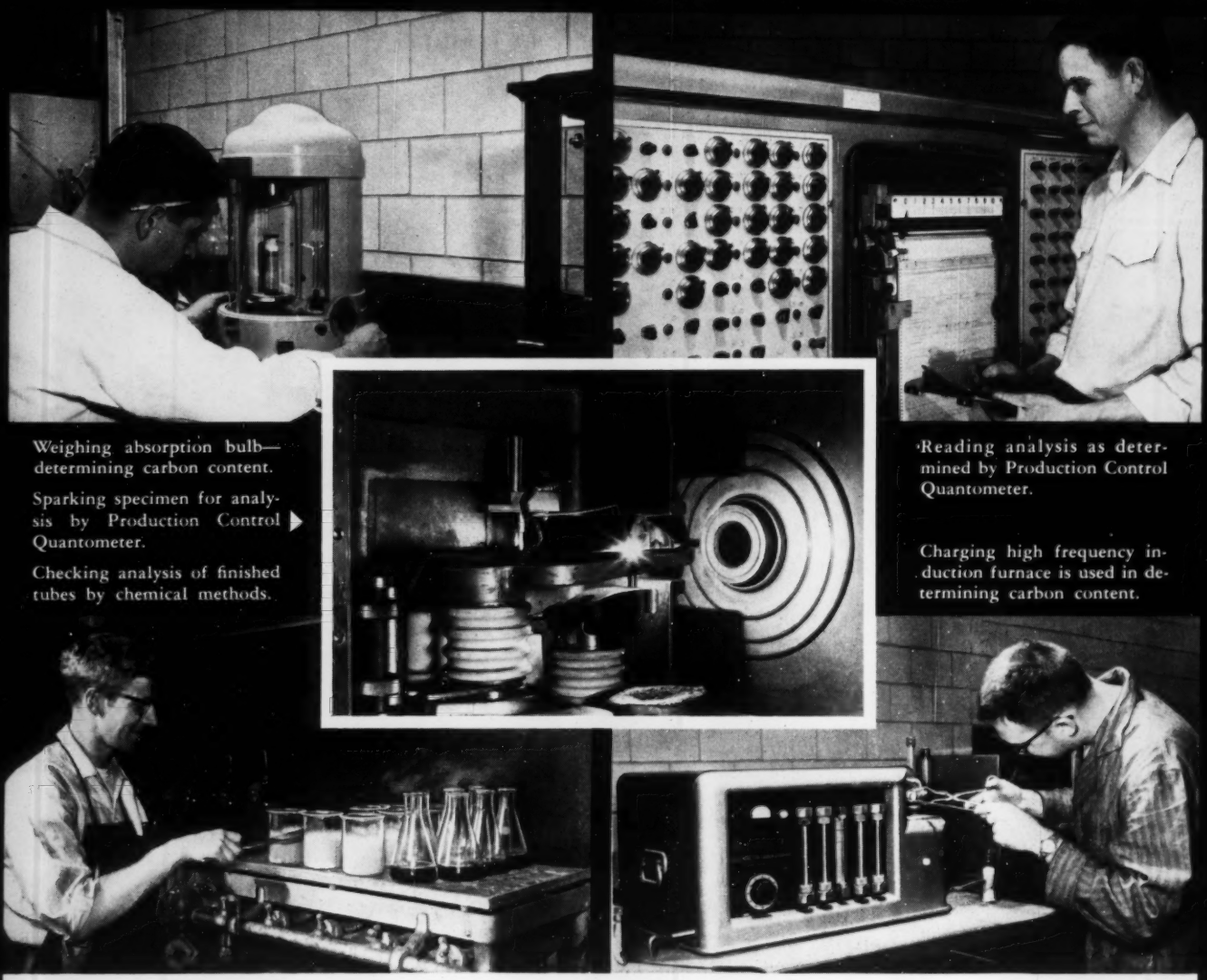
. . . makes complex shapes in continuous strips . . . page 95

✔ More Steel for Construction in '57 —page 53

✔ Better Year for Railmakers —page 151



CONTENTS — PAGE 5



Weighing absorption bulb—determining carbon content.

Sparking specimen for analysis by Production Control Quantometer.

Checking analysis of finished tubes by chemical methods.

Reading analysis as determined by Production Control Quantometer.

Charging high frequency induction furnace is used in determining carbon content.

THE O.K. YOU DO NOT SEE IS YOUR GUARANTEE

The key to the physical and mechanical characteristics of any steel lies in its analysis. Tensile strength, corrosion resistance, resistance to "creep" at elevated temperatures, reaction to heat treatment—to name a few—are largely determined by composition.

Through B&W's analytical laboratories pass the tubing destined for practically every known type of pressure or mechanical application—hundreds of different steels—each with its own particular characteristics—and checked by technicians who know their job and using the most advanced laboratory equipment available anywhere.

Modern control methods, plus years of experience help to make the B&W laboratory "O.K." the invisible hallmark of tubing quality—and is your assurance of ease of fabrication and good service. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA-7019-G3

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels.

PUMP ROTOR FABRICATED FROM STEEL PLATES

This pump rotor, fabricated from Bethlehem plates, is made to rigid dimensional specifications in order to control pumping action, balance and heavy intermittent loadings. Here, in the Acme Welding Division of United Tool & Die Co., Hartford, Conn., the rotor blades, precut from ⅝-in. Bethlehem plates, are welded in place. The uniform quality of Bethlehem plates makes them ideally suited for fabricating intricate weldments. Bethlehem plates, together with the use of good welding technique, give assurance of sound welds. They come in a full range of sheared and universal-mill sizes.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

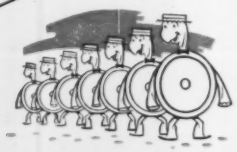
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

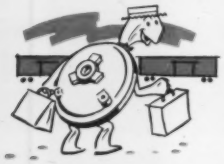
BOY!

LYNCHBURG FOUNDRY
SHELL CASTINGS
SAVE SAVE SAVE!



GREATER UNIFORMITY—They don't have to spend so much time getting ready to grind on me, and my shell has a better chance of pulling through the machine shop operation. Sometimes my shell has to be balanced, and the greater uniformity saves on this operation too...

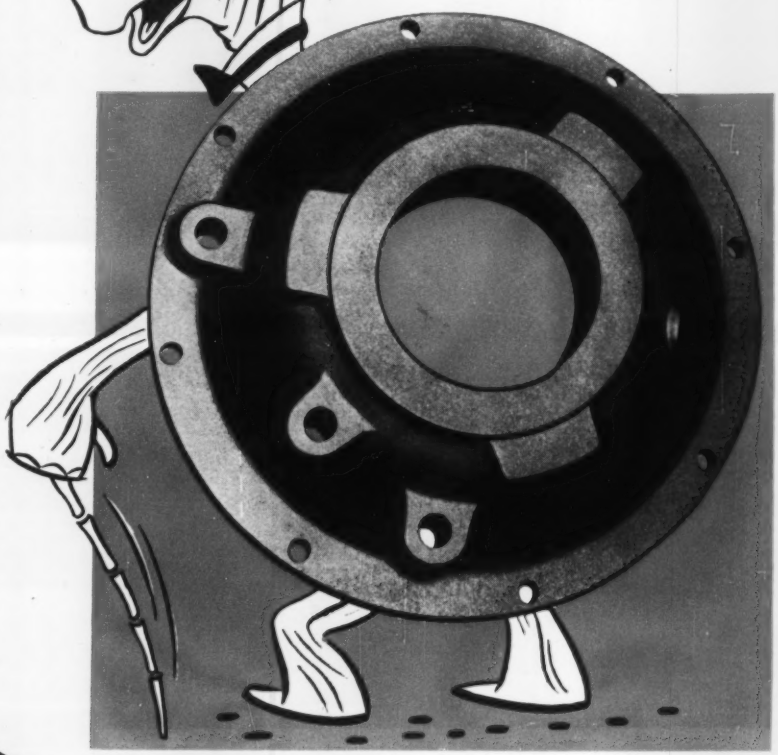
LESS MACHINING—Fewer backaches! Close control of dimensions makes for less machining, faster machining methods, or in some instances elimination of machining altogether.



MADE FOR LIGHT TRAVEL—My Lynchburg Foundry shell surely makes for cheaper transportation fares — less machine stock makes me a "Light-Weight".

SUPERIOR SURFACE FINISH—I call it "eye appeal"—I really feel sharp in my Lynchburg Foundry shell molded shell. Saves wear on machine tools too.

GRAY IRON AND DUCTILE IRON—
Heat treated
or as cast



You can't tell us turtles much about this shell game—we've been in it a long time—but I'd sure like for my whole family to hear about Lynchburg Foundry shell castings.

The snazzy outfit I'm wearing is called a gear box cover—shell molded, of course. You ought to have seen all the things that had to be done to an outfit like mine in the old days—before shell molding. But all that's changed—even the bolt holes around the edge are cast in. Then too, the pipe tap holes are cast so accurately that the drilling operation, which normally precedes the pipe tapping operation, is eliminated. And the machining that has to be done takes a lot less time—there's less machine stock, and the chucking lugs are cast so accurately.

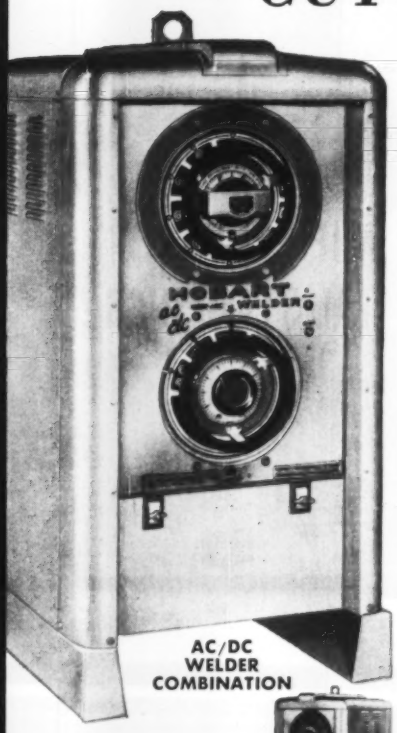
As one shell man to another, take my advice—specify Lynchburg Foundry shell castings.

LYNCHBURG FOUNDRY CO., Lynchburg, Virginia

DISTRICT SALES OFFICES:

50 BROAD ST., NEW YORK, N.Y. • 122 SOUTH MICHIGAN AVE., CHICAGO, ILL. • 1783 E. 11TH ST., CLEVELAND, OHIO

Check *the MANY WAYS you can CUT COSTS with Hobart Welders!*



AC/DC WELDER COMBINATION

New Convenience – many built-in extras, such as remote control and fast acting polarity switch – at no extra cost – that's the story of Hobart Welders.

It's the extra features that help to lower your operating costs and realize more profit on production, maintenance, construction and general repair work. Versatility is another Hobart byword.

For instance, the brand new Hobart AC-DC Welder lets you take full advantage of the latest types of electrodes and sizes for both AC and DC welding. In addition to having AC or DC welding, you'll want to see and know about variations of this welder that let you do Inert Gas Welding.

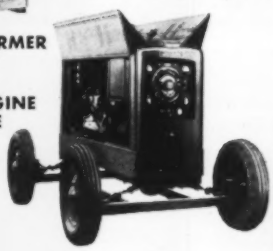
Hobart Welders will amaze you with their wide welding range and top performance. To compare is to be convinced. And Hobart has a complete line of welders, so that you can select the right size and type welder to handle your particular work.

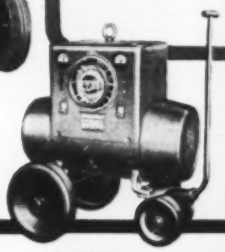
Phone or write now for complete specifications, prices, or any other information, to HOBART BROTHERS COMPANY, BOX ST-37, TROY, OHIO, Phone FEderal 2-1223.

DC RECTIFIER

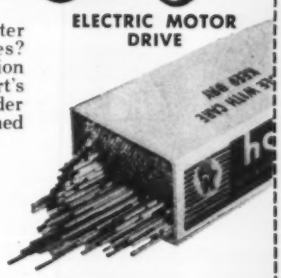
AC TRANSFORMER

GAS ENGINE DRIVE

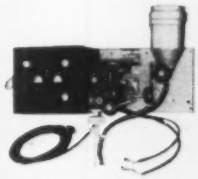




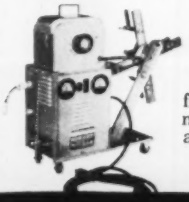
ELECTRIC MOTOR DRIVE



Have you tried the new and faster Hobart Iron Power Electrodes? Keep pace with faster production and lower cost welding. Hobart's "Rocket 24" hi-speed iron powder electrodes are especially designed for using the "drag" technique. Deposition rate is much higher than conventional type electrodes. Beads are smooth. Slag is practically self removing. Get more inches of weld per electrode. For proof —try a few "Rocket 24" electrodes on your own work.



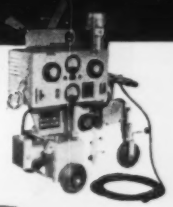
FULLY AUTOMATIC
submerged arc welding with new "simplified" controls



HANDOMATIC
for semi-automatic submerged arc welding

"Simplified Control Automatic Welding"

Eliminates complicated electronic controls. Even less experienced welders can double output and produce uniform high quality welds.



TRACTOR TYPE
for submerged arc welding

POWROMATIC
for automatic arc welding

See demonstrations

of these amazing new welders

WESTERN METALS SHOW
Los Angeles — March 25-29
BOOTH #650

A.W.S. SHOW
Philadelphia — April 9-10-11
BOOTH #100

Hobart
" one of the world's largest builders of arc welding equipment "

HOBART TROY OHIO WELDERS

HOBART BROTHERS COMPANY, Box ST-37, TROY, OHIO

Without obligation, send complete information on:

_____ ampere capacity

- ☐ AC/DC Welder Combination
- ☐ DC Rectifier
- ☐ AC Transformer
- ☐ Gas Engine Drive
- ☐ Electric Motor Drive
- ☐ Fully Automatic
- ☐ Handomatic
- ☐ Tractor Type
- ☐ "Powromatic"
- ☐ Iron Powder Electrodes

Name _____

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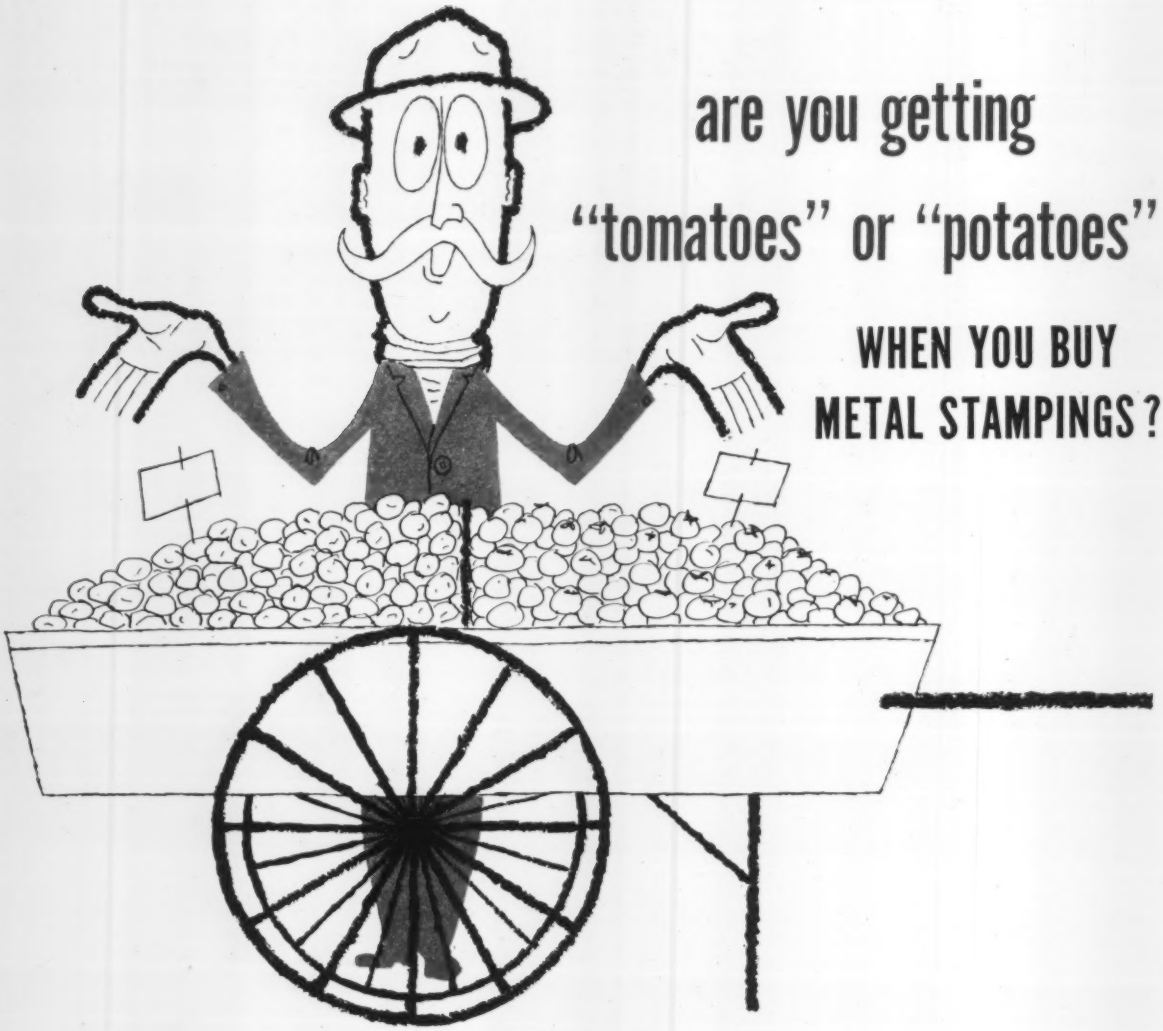
City _____ State _____



are you getting "tomatoes" or "potatoes" WHEN YOU BUY METAL STAMPINGS?

After selling tomatoes for less than they cost, a huckster may recoup his losses by making a long profit on potatoes.

By operating on a "catch-as-catch-can" basis such as this, a metal stamping concern might come out ahead . . . *if extremely fortunate.* But, how about its customers . . . those who are buying either sub-standard "tomatoes" or high priced "potatoes"?

No customer expects to pay more than is fair . . . no customer expects to get less than his share . . . and at Crosby no customer does, for a uniform price policy is maintained with care.

Each quotation is calculated on the same basis: Costs are carefully computed on a single standard of quality plus a fair and reasonable profit. In this way, Crosby is assured of the working capital required to pay employees adequately and to keep the plant in tip-top operating shape . . . both of direct benefit to customers.

By netting a reasonable return on each job produced, Crosby is in a position to produce all jobs efficiently and economically. In short, when you do business with Crosby, there are no "tomatoes" or "potatoes."

THE CROSBY COMPANY

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420 William Street, Buffalo 4, N. Y.

OFFICES: Chicago • Cleveland • Detroit • New York • Philadelphia

IN THIS ISSUE

STEEL
The Metalworking Weekly

March 4, 1957
Vol. 140 No. 9

METALWORKING OUTLOOK

47 **Escalator pay boosts affect many metalworkers on Mar. 1.** Most increases are 1 cent an hour

☑ 53 **Enough steel for construction?** Not quite, but prospects improve

54 **New England's growth** supported by electronics and plastics industries

55 **India's machine tool builders seek** U. S. designs, know-how

56 **Joint companies on increase**—It's cheaper route to diversification

57 **Price increase coming for electrical machinery?** Westinghouse survey indicates answer is yes

58 **Plumbing fixture sales to stay up** despite lag in home building

59 **More expansion planned** by Armco Steel Corp.

63 **Where are they now?** A study of Case's class of '41

☑ 64 **Demand pattern for do-it-yourself equipment shifts**—Easy sell days gone

81 **Industry spends millions for research,** development and engineering

TECHNICAL OUTLOOK

93 **New metal developed for jet engine turbine discs** could add 100 mph to top speed because of increased operating temperature

94 **Metal drums coated centrifugally**—Lining thickness held to ± 0.0001 in.

COVER ARTICLE

95 **Cold roll forming**—You can make complex shapes in continuous strips. It's an easy way to cut costs

99 **Giant lathe boosts roll turning**—Saves machining hours and dollars

102 **Progress in Steelmaking**—Maintaining the open hearth. Information on repairing breakouts, bottom damage, tap and flush holes, and roofs

115 **Nuclear power takes another step**—Capacity total near 1½-million kw

116 **Electrostatic painting**—It cuts costs in small plant, too

118 **Tooling becomes massive** as aircraft get larger

120 **Porosity in metal castings sealed** by impregnation

☑ 126 **New welding process** said to offer five advantages

MARKET OUTLOOK

149 **Good possibility: Stronger steel demand**—Indexes and composites, 159; steel prices, 161; ores, 167; ferroalloys, 168; scrap trends, 170, prices 172

151 **Railmakers optimistic**—Gain forecast in sales of railway track materials as carriers plan bigger capital, maintenance outlays

174 **Nonferrous metals**—Brass mill outlook improves—Prices, 176

REGULAR FEATURES

6 Behind the Scenes
10 Letters to the Editors
16 Staff
23 Calendar of Meetings
51 The Editor's Views
60 Windows of Washington
67 Mirrors of Motordom
71 The Business Trend
75 Men of Industry
131 New Products
146 New Literature
179 Advertising Index

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Something to paste in Your Hat!
WALSH APEX
Extra Duty Firebrick
is the last word in high bulk density, low porosity, high heat transfer, maximum resistance to slag penetration and metal wash.

Designed specifically for use in lining closed and semi-closed hot metal torpedo type ladles, hot metal mixers and for checkering open hearths and hot blast stoves, Apex offers greater value per dollar invested. Isn't this the kind of economical service you want from the refractories you use?

WRITE FOR DETAILS

Specialists in Refractories of High Bulk Density and Low Porosity

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REFRACTORIES CORPORATION
101 FERRY STREET • ST. LOUIS 7, MO.
FOR OVER 60 YEARS MANUFACTURERS OF HIGH GRADE REFRACTORIES

behind the scenes

Synchronized Attack

Fear is an amazing emotion. It stirs up and triggers other emotions in a macabre chain reaction. Note how it leads to dread, to fright, to alarm, to dismay, to consternation, to panic. Editor-in-Chief Irwin Such commented constructively on this phenomenon recently while speaking before the Mahoning Valley Sales Executive Club at Youngstown. Mr. Such emphasized that the worst thing we have to fear is the unreasoning fear which causes persons to withhold the investment of their savings or to refrain from buying things they normally would buy freely.

While Mr. Such was talking to Youngstown brass at the Elks' Club, Associate Managing Editor Vance Bell was polishing a verbal blast at calamity howlers which he delivered before 700 business executives in St. Louis. Vance gave his talk, with slides, on St. Valentine's night, but that wasn't why his audience loved it. He backed his performance with reassuring facts and figures.

The Mahoning Valley group presented Mr. Such with a battery-powered mahogany clock with ceramic numerals, which so delighted him that he hung it above his desk, after writing a memo to himself to replace the batteries 700 days later—because that is when the clock will run down.

What with Editor Walt Campbell's editorial attack on wolf criers (STEEL, Feb. 4), and the above mentioned oral assaults on faint business hearts, you might say that STEEL is running its own onslaught against recession talk.

Across el Rio Grande

When higher learning came to the New World, its first seat was in Mexico. Four hundred years ago, when Massachusetts was as bare of Pilgrims as Montreal is of aardvarks, half a dozen colleges were operating in Mexico. The quality of education in that country has been consistently high, and the perception of its educators unusually keen, and in testimony whereof we submit this evidence:

A postcard, postmarked Mexico City, arrived in STEEL's editorial offices several days ago. Signed by Miss Joyce Steinecke, Mexico City College, it carried this message in a delicate feminine hand: "Dear Editor: Please send me a copy of your magazine. My magazine writing teacher told me it is beautiful, and I'm anxious to see it."

Betty Zayac, editorial assistant, immediately brushed and polished a fresh copy of the Feb. 18 STEEL, and sent it with a flourish south of the border. This magazine is no stranger in the land of the Aztec; about two dozen copies are mailed there each week, but it's nice to know that its reputation has earned it an invitation to appear on a college program.

Hot Story on Cold Rolling

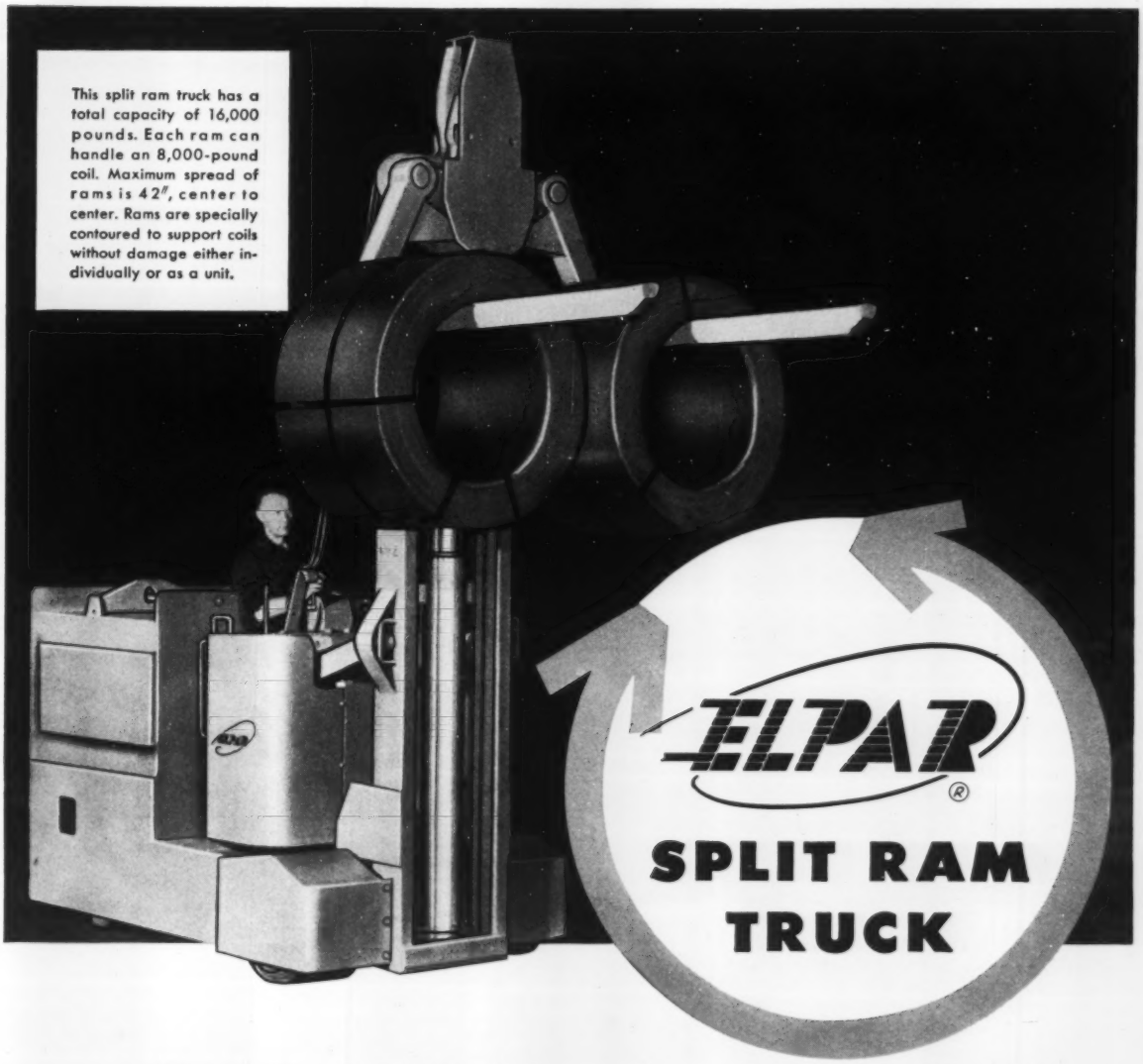
Terrible Tommy Welsh, the fisherman-turned-artist (or vice versa) designed this week's cover. Ninth in a series of production ideas, the cover story describes how cold rolling can make a variety of complicated items faster and cheaper—and don't let that word "cheaper" throw you. Advertising schools prefer to tone down use of that word on the ground that it connotes shoddiness, but when you are after hard facts, particularly concerning costs, "cheaper" really gets the idea across. Terrible Thomas was so intrigued by Assistant Editor Ross Whitehead's manuscript describing some of the amazing production results of cold rolling he almost forgot to design the cover in time.

Southern Ram

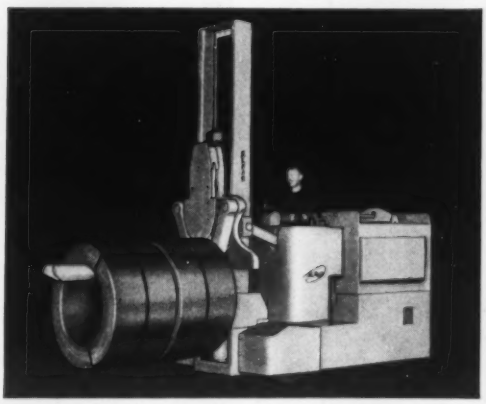
"The General Steel Bunch" at Granite City, Ill., was the first to note that three words were inadvertently cut from the Feb. 4 puzzle immediately following the words "28 cans." Re-insert "in eight days," and take it from there. In the meantime, what was the name of the Confederate vessel that fought the *Monitor* to a draw?

Shrdlu

(Metalworking Outlook—Page 47)


This split ram truck has a total capacity of 16,000 pounds. Each ram can handle an 8,000-pound coil. Maximum spread of rams is 42", center to center. Rams are specially contoured to support coils without damage either individually or as a unit.
ELPAR®
SPLIT RAM TRUCK

Handles TWO for the cost of ONE



Truck with rams together handling coils in the conventional manner.

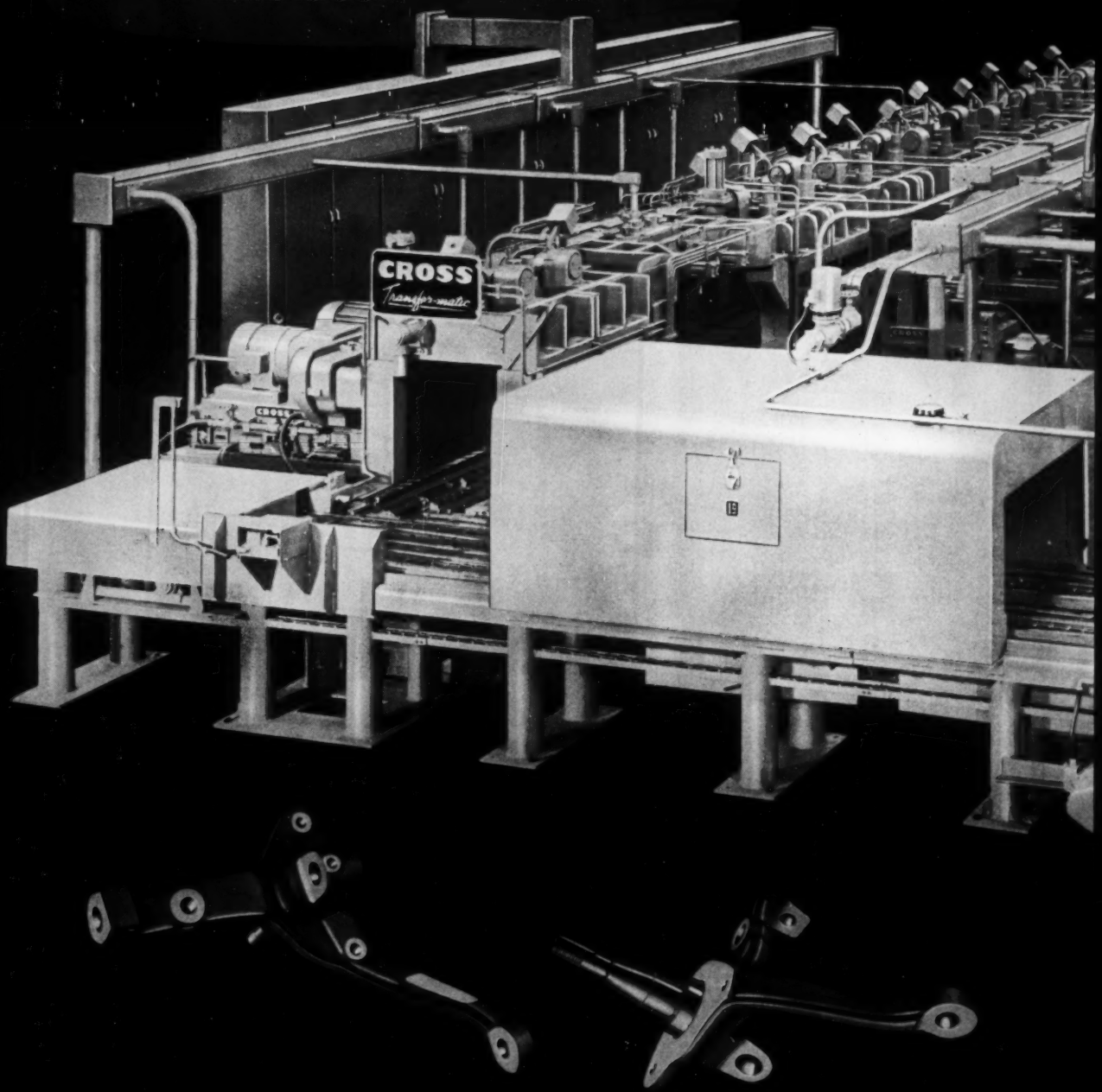
In a few seconds, the hydraulically-operated rams on this versatile ELPAR truck can be spread to handle two coils abreast . . . or brought together for single-ram truck operation. Therefore, you get *double-duty* performance—*double-fast* handling of different-size coils. Coil movement keeps pace with mill machinery . . . storage is faster . . . operating costs are reduced.

Available in a range of capacities, ELPAR split ram trucks are another result of Elwell-Parker's 50 years' experience in originating trucks and attachments to reduce steel handling costs. Like all ELPAR trucks, they are built to give dependable service year after year.

LEARN how you can save with ELPAR split ram trucks . . . write today.

THE ELWELL-PARKER ELECTRIC CO.
4102 St. Clair Avenue Cleveland 3, Ohio

Mills, Drills, Reams, Threads Integral Front Wheel Spindle and Steering Arm



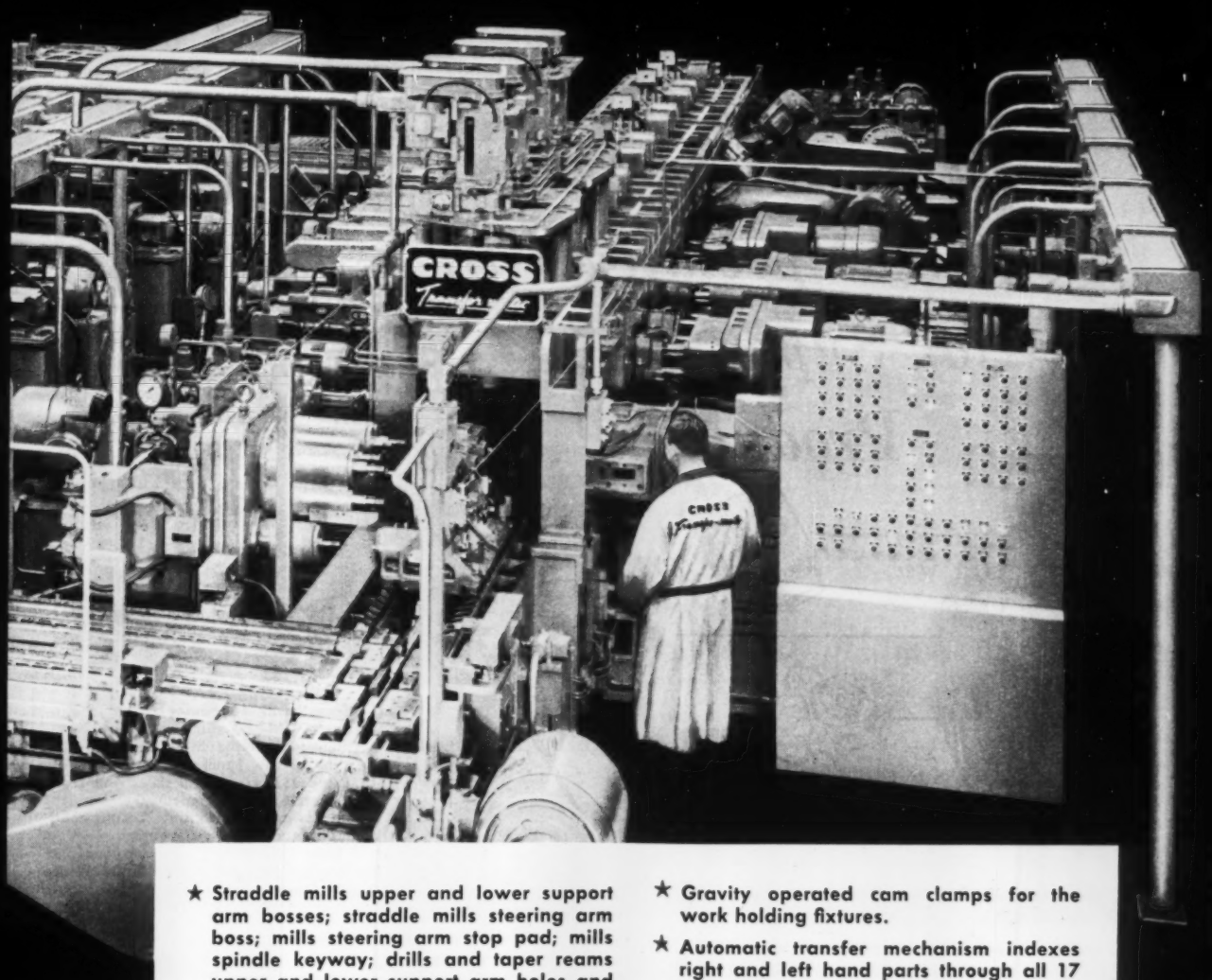
Established 1898

THE CROSS CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

Another Transfer-matic by Cross



★ Straddle mills upper and lower support arm bosses; straddle mills steering arm boss; mills steering arm stop pad; mills spindle keyway; drills and taper reams upper and lower support arm holes and steering arm hole; drills, reams, chamfers and spotfaces two brake mounting plate holes; drills, counterbores, spotfaces, chamfers and reams brake anchor hole; drills spindle cotter pin hole; and threads wheel spindle.

★ 144 right and 144 left hand parts per hour at 100% efficiency.

★ Pallet type work holding fixtures locate parts from spindle bearing diameters.

★ Power wrench clamps work holding fixtures automatically.

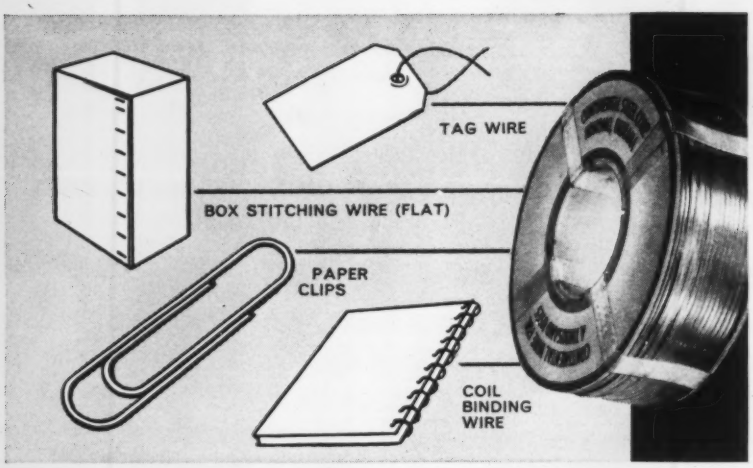
★ Gravity operated cam clamps for the work holding fixtures.

★ Automatic transfer mechanism indexes right and left hand parts through all 17 stations in pairs.

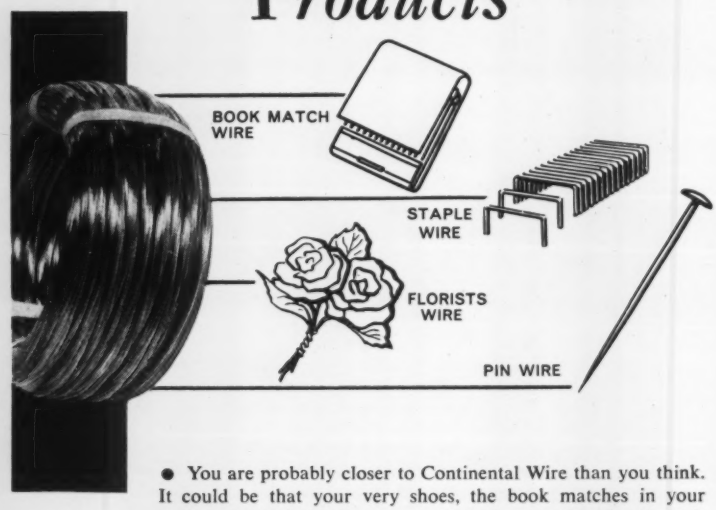
★ Automatic indexing units turn fixtures 82° at Stations 11 and 17.

★ Cross modular unit construction provides flexibility for design changes.

★ Other features: construction to JIC standards; hardened and ground ways; hydraulic feed and rapid traverse for milling, drilling and reaming; individual lead screw feed for threading; automatic fixture cleaning unit; complete interchangeability of all standard and special parts for easy maintenance.



Fine and Specialty Wire for Super Fine Products



● You are probably closer to Continental Wire than you think. It could be that your very shoes, the book matches in your pocket or the paper clips in your desk—were made using dependable Continental Fine Wire! That's because Continental is preferred by hundreds of leading firms for literally thousands of different fine wire applications. For super fine products—you, too, should try Continental Fine and Specialty Wire, available in many sizes, of almost any temper, finish or analysis, in low carbon and medium low carbon steels.

For the finest in fine wire—call in Continental!

CONTINENTAL

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Wire Specialists for over half a Century

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

LETTERS
TO THE EDITORS

Seaway Article to Railroads

I find your article, "Ports Race Seaway" (Feb. 4, page 63), interesting and am taking the liberty of distributing copies of it to chief traffic officers of the railroads.

W. J. Kelly
Vice President
Association of American Railroads
Washington

Real Eye Opener

I would appreciate four copies of the article, "Cold Heading Branches Out" (Jan. 14, page 71). They will be circulated to our two engineering departments, purchasing and production.

Although many of our parts lend themselves beautifully to this process, we have apparently overlooked it almost entirely. The article is informative, well written and a real eye opener.

R. G. Hunter
Engineering
AiResearch Mfg. Co. of Arizona
Division of Garrett Corp.
Phoenix, Ariz.

Answer to Executive Shortage

Please send 15 copies of your Program for Management article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93). It gives a clear and readable plan for management development which I want to distribute to our management and advisory groups.

I have collected several of your past articles for this same distribution, since I feel they are a valuable addition to our personnel development files. STEEL is to be congratulated on preparing and circulating such excellent material.

Scott E. Foster Jr.
Purchasing Agent
Tektronix, Inc.
Portland, Oreg.

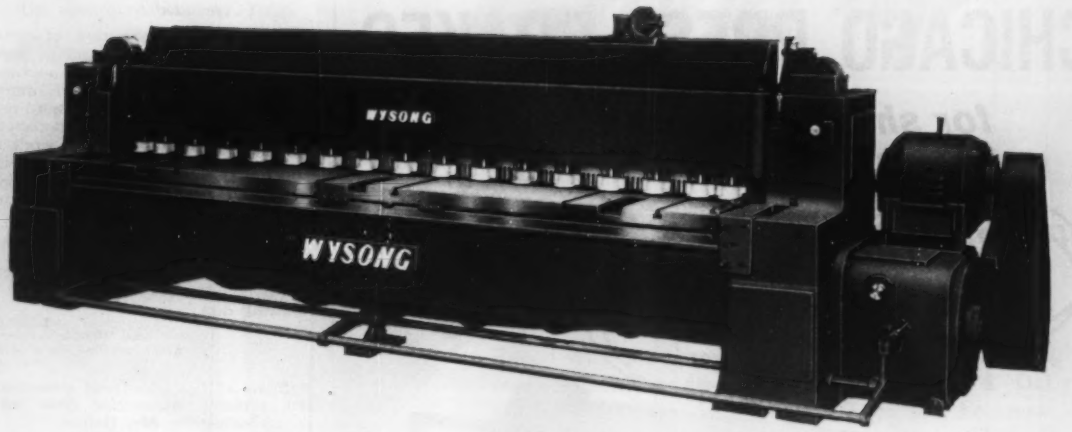
Comment on Flash Welding

I read with interest the article, "A Metallurgist Looks at Flash Welding" (Jan. 28, page 90). I would like to offer some comment on the box headed "How To Avoid Cracks in Rings."

We believe that cracks initiating in die marks or at locations of sharp bend are, of course, serious from the point of view of scrap. Such cracks, however, are almost always visible from the surface and easily detected.

The great advantage that we see in welding on flat dies is that the line of pressure is normal to and through the weld plane. This provides for a

(Please turn to page 12)



Wysong
Squaring Shears
are

Wysong No. 1225, capacity ¼"
mild steel, cutting length 12 feet.

RUGGED to resist shock and pounding

RIGID to maintain accurate alignment

The primary function of Wysong Shears is to give you maximum production with unsurpassed accuracy — day after day, month after month. Their massive hi-tensile castings assure greater resistance to deflection. Their extra large, accurately machined bearing surfaces prevent twists and binds.

Holddowns provide all the power needed for positive clamping of stock — yet, are easily adjusted to prevent marring soft metals or polished sheets.

Ball-bearing, precision back gauges are designed and built to withstand the impact of volume shearing. Easily adjusted to compensate for eventual wear.

Automatic lubrication is standard on larger models — one-shot lubrication on smaller models.

Safety features include totally enclosed clutch and gears, adjustable stationary finger guards, non-repeat unit and treadle lock.

Simplicity of operation and superior design are keys to low maintenance and low down time.

Power models are available with cutting lengths from 48 inches through 12 feet — capacities from 16 gauge through ⅜" mild steel.

For greater accuracy, larger volume, easier operation and the finest in design — Buy a WYSONG . . . It's MILES Ahead!

Buy A Wysong ... It's Miles Ahead

WYSONG

NATIONAL MACHINE TOOL BUILDERS ASSN. MEMBER

Wysong and Miles Company
Greensboro, N. C.

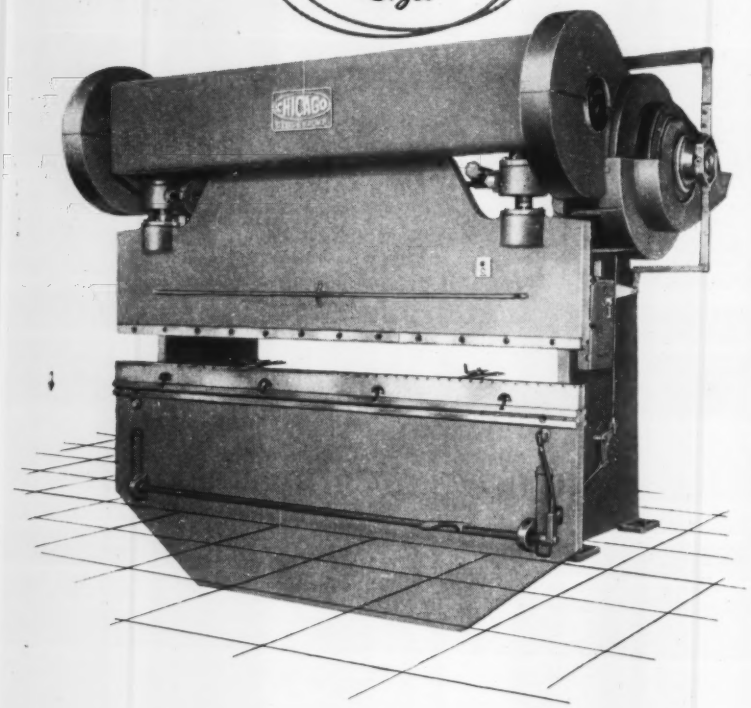
CHICAGO® PRESS BRAKES

for sheet metal and plates

Advanced Design

50 Standard Sizes

Capacities 11 to 450 tons



This is one of the Series D CHICAGO press brakes. It has a bending capacity of 10 feet by ¼ inch—150 tons. Over-all bending length is 12'-2".

Complete recommendations for any job on request.

6777

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side-Type Presses • Press Brake Dies

Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7458 South Loomis Boulevard, Chicago 36, Illinois

LETTERS

(Concluded from page 10)

more uniform distribution of pressure across the weld. The danger of bending or slipping at the weld is minimized. Defects which result from improper pressure distribution are not readily visible and hence can go undetected.

Perhaps since most of our work is on heavier sections and since these sections are always heated before restoration to shape, the possible defects called out in your article have not appeared so serious to us.

On relatively light sections, and, particularly, where no subsequent heating is involved, we do frequently use rounded dies.

I. A. Oehler
Vice President-Operations
American Welding & Mfg. Co.
Warren, O.

• *Some of the qualifying statements in the author's manuscript clear up the points raised by Mr. Oehler.*

Article to Board

Your article, "Get Set for Metalworking's Fabulous Future" (Jan. 7, page 123), has put into print many of the things which we have been talking about and planning for ourselves here.

This presentation is so good that I would like to have 50 copies to send to our board of directors, all our executives and those in our second tier of management.

William L. Dolle
President
Lodge & Shipley Co.
Cincinnati

Cutting Down on Fatigue

Please send a tear sheet copy of the interesting article, "Warm Drawing Improves Fatigue Life" (Jan. 28, page 94).

Andrew Van Echo
Joslyn Stainless Steels
Ft. Wayne, Ind.

Two Sides to a Story

We would like to request 50 copies of the editorial, "Don't Cry Wolf" (Feb. 4, page 57). There are always two sides to a story. Either version heard separately may provoke considerable havoc—mentally, orally or physically, as the case may be. Knowing both sides of the story, at least a degree of balance is established.

We would like to distribute these reprints to our men in the field. We think it presents a view they should read to better judge the events at hand.

Walter M. Bohne
Manager, Sales Promotion & Advertising
Marathon Electric Mfg. Corp.
Wausau, Wis.

Electric Steel Furnaces

Which is the largest electric steel furnace in the U.S. and how many are there? Is this information also available for five and ten years ago?

D. McM. Blackburn
Plant Manager
Hendrick Mfg. Co.
Carbondale, Pa.

• *The largest of the 263 electric furnaces operating in 1956 was the 200-ton unit (24½-ft hearth) at McLouth Steel Corp., Detroit. Of 256 operating in 1951, the largest was 125 tons (22-ft shell) at Northwestern Steel & Wire, Sterling, Ill. Of 222 in 1946, largest was 85 tons at Timken Steel & Tube, Canton, O.*

Going up...

with a lift from FRASSE stock tubing!

Courtesy: Industrial Service Co.

Faced with an almost impossible delivery deadline, the maker of this hydraulic elevator needed a 6″ OD ram and a 5″ OD ram to telescope. Then too, he knew that final sizing would consume valuable time. With Shelby seamless tubing specified – and speed essential . . . he put in a hurried call to Frasse.

Frasse not only made delivery *immediately* from stock–but was able to *select*, from commercial tolerance material, two tubes so close to final size that only minor honing and turning were necessary. This lift from Frasse stock tubing enabled the elevator to be completely installed, approved . . . *and in operation*, days sooner than had been anticipated.

Tubing stocks at Frasse are in good supply – and quick Frasse delivery helps you get jobs done faster. So, depend on a dependable tubing source – *call Frasse* whenever you need mechanical tubing, stainless tubing, hydraulic and pressure tubing, centrifugally spun tubing – or even a bit of assistance from Frasse tubing specialists. They'll be happy to work with you on any problem involving a tubular product.

Seamless and Welded Mechanical Tubing
Pressure, Condenser and Hydraulic Tubes
Stainless Tubing, Seamless and Welded
Stainless Pipe, Valves and Fittings
Aluminum Tubing, Pipe and Fittings
PVC Plastic Pipe, Valves and Fittings

Peter A. Frasse & Co., Inc.

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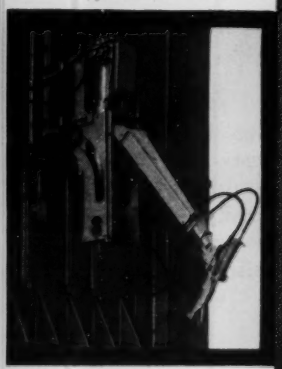
LYNDHURST • ROCHESTER • BALTIMORE

see how mighty Niagara Presses



IRON HAND removes finished stampings from the press, ***automatically.***

BRAIN CENTER OF THE AUTOMATION SYSTEM, the Rotary Limit Switch can be adjusted precisely while the press is in motion to synchronize automation mechanical devices with the press cycle.

Niagara SE2-300-84-60
Straight Side Eccentric Geared Press
Equipped for Automation

are automated for peak productivity

Engineered to excel in large, heavy tonnage drawing, punching and blanking work, Niagara Straight Side Eccentric Geared Presses are readily outfitted with the most advanced automation controls and devices. Net result: Streamlined production, greater safety and simplified operation.

Take a look at the modern, enclosed construction of this rugged Niagara Two-Point Eccentric Geared Press. See how today's most advanced automation controls and devices are furnished as integral, built-in components of the press itself . . . *with piping and wiring fully concealed.* Note, too, how the driving assembly is neatly housed within the crown. Nothing has been overlooked in making this press an outstanding engineering triumph.

Niagara's eccentric drive delivers greater torque with less deflection. Rigid, all-steel, four-piece, tie rod frame provides utmost accuracy and prolonged die life. Niagara's low inertia, pneumatic friction clutch runs cooler and outlives others, for most of its weight continues to rotate with the flywheel to reduce heat and wear.

MAKE SURE THAT YOU HAVE ALL OF THE FACTS on Niagara Straight Side Eccentric Geared Presses . . . the one point, two point and four point designs in capacities from 100 - 1000 tons . . . and how they can be equipped for automation. Write for illustrated Bulletin 66 today.

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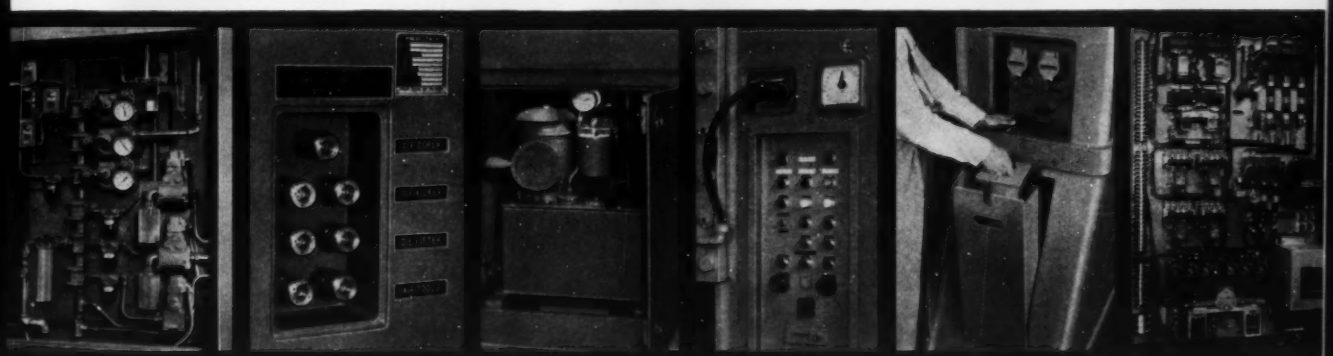


AIR CONTROL PANEL (Above left) conceals and protects air line pressure switches, lubricators, filters, gauges and valves behind dust-tight doors within one of the uprights.

CONTROLLED AIR SUPPLY RECEPTACLES (Above right) are provided for die doper, die kicker and die lifter, all synchronized with press cycle. Auxiliary receptacles are for die maintenance tools.

AUTOMATIC CIRCULATING OIL SYSTEM (Above left) sends metered flow of clean, filtered oil to all bearings and gears in the crown, as well as to slide gibs. Correct operating oil pressure is maintained or press stops automatically.

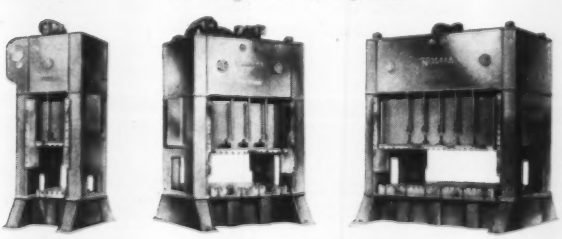
OPERATOR'S PANEL (Above right) features de-luxe operating controls conveniently arranged for fingertip direction of every press motion. Note receptacle for "RUN" push button station and Selsyn stroke position indicator.

AUX. POWER SUPPLY & SAFETY BLOCK. (Above left) Two 110 V. and two 440 V. receptacles for automation equipment, conveyors, tools, etc. Safety block (stored in bin) is chained to safety plug which de-energizes press control when pulled from receptacle.

COMB. MOTOR & PRESS CONTROL (Above right) in oil and dust-tight enclosure flush mounted in frame.

ONE-POINT, TWO-POINT AND FOUR-POINT SUSPENSION

(100 through 1000 ton capacities)



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straight side ECCENTRIC GEARED presses

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

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Yes...

Valvoline Tectyl Rust Preventives save money, time and worry.

SEND CONVENIENT COUPON TODAY FOR COMPLETE INFORMATION BOOKLET

S-3-57

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VALVOLINE OIL COMPANY
(Div. of Ashland Oil & Refining Company)
FREEDOM, PENNSYLVANIA

Please rush my copy of your newest booklet entitled, "The Key to Rust Prevention," which tells about the problems of rust, cleaning my products, materials in corrosion preventives and how to choose a rust preventive.

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Pioneer and leader in investment casting, Austenal, Inc., is building a new 85,000 square foot plant to augment its present Microcast production facilities.

Austenal's new LaPorte, Indiana plant will allow for greater casting versatility, with the precision and superiority inherent in Microcast parts.

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THE COMPLETE INTEGRATION OF THEIR SALES FORCES

Now, the United States Gasket Company will be known as the United States Gasket Company, Plastics Division of The Garlock Packing Company.

In August 1955 Garlock acquired the United States Gasket Company. Subsequently, the production facilities of both companies were integrated. Now, it is clear that the customers of both companies will be better served through an integrated sales force.

Better Service for Customers

Both U.S.G. and Garlock customers will now enjoy the finest, most complete service available in the fields of fluorocarbons (Teflon* and Kel-F**), nylon and other plastics as well as mechanical packings and seals of all types. Specialists in specific materials and applications will always be available for consultation on your problems.

Saves You Time

This integration of sales forces will also simplify your purchasing problem . . . you can standardize on one reliable source of supply and have more time to devote to other important problems.

Unbiased Recommendations

With the addition of U.S.G. plastic products to the famous "Garlock 2,000" family of packings, gaskets, and seals, your local representative is able to supply the right seal for every conceivable need. Call him at the office nearest you.

30 Sales Offices

U.S.G. plastics specialists join the 125 Garlock salesmen at 30 sales offices and warehouses where large stocks of plastic products are stored. This means faster deliveries from local stocks, as well as expert plastics and sealing assistance as close as your telephone.

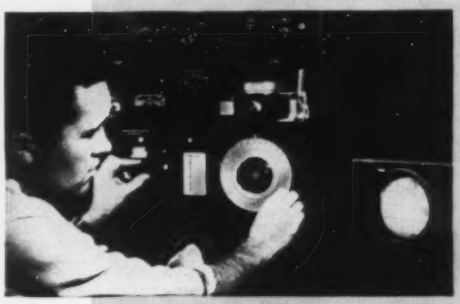
*DuPont Trademark
**M.W. Kellogg Trademark

Main Factory Buildings of The Garlock Packing Company, Palmyra, New York. Other factories in San Francisco and Canada.

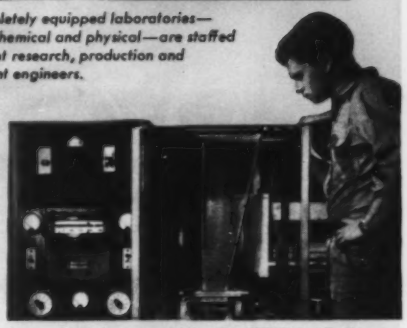
One of the two Camden, N.J. plants of the United States Gasket Company, Plastics Division of The Garlock Packing Company

United States Gasket

SPECIALIZED PLASTICS PRODUCTS FACILITIES AT U.S.G.



Three completely equipped laboratories—electrical, chemical and physical—are staffed by top-flight research, production and development engineers.



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Giant presses cold mold TEFLON sheets up to 48" x 48" in size, ready for sintering.

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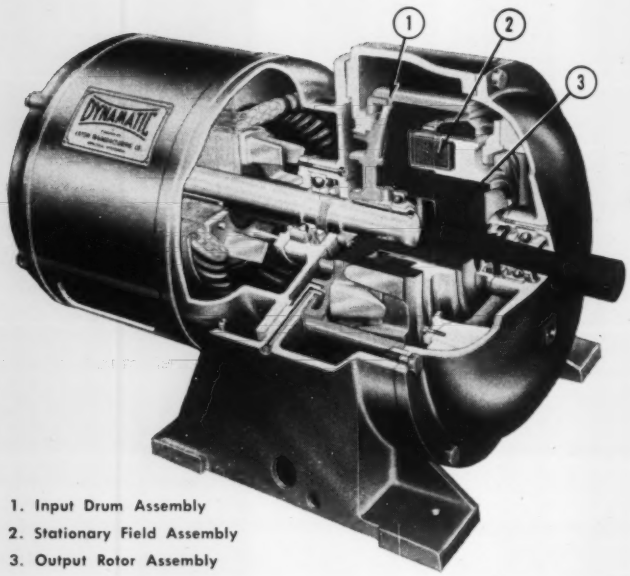

1. Input Drum Assembly
2. Stationary Field Assembly
3. Output Rotor Assembly

1. Adjustable speed from AC power source
2. Accurate speed control
3. Wide speed range
4. Rapid response
5. Low power losses
6. No commutators, rings, brushes, or rotating coils
7. Simple construction
8. Remote control
9. Quiet, efficient operation
10. Low maintenance cost

For a long list of industrial drive applications where stepless adjustable speed is required, the new Dynamatic Dynaspede® Drives are ideal. The liquid-cooled, completely enclosed, stationary field eddy-current couplings are available mounted integrally with D-flange squirrel cage motors in capacities from 3 to 75 HP. Motor types available are drip-proof, totally enclosed fan-cooled, and explosion-proof.

Separately mounted couplings in capacities from 3 to 2500 HP, and larger, are also available. Dynamatic electronic or magnetic amplifier controls, in combination with these drives, provide wide latitude in operating functions.

Send for Illustrated Literature Describing These New Stationary Field Drives and Couplings

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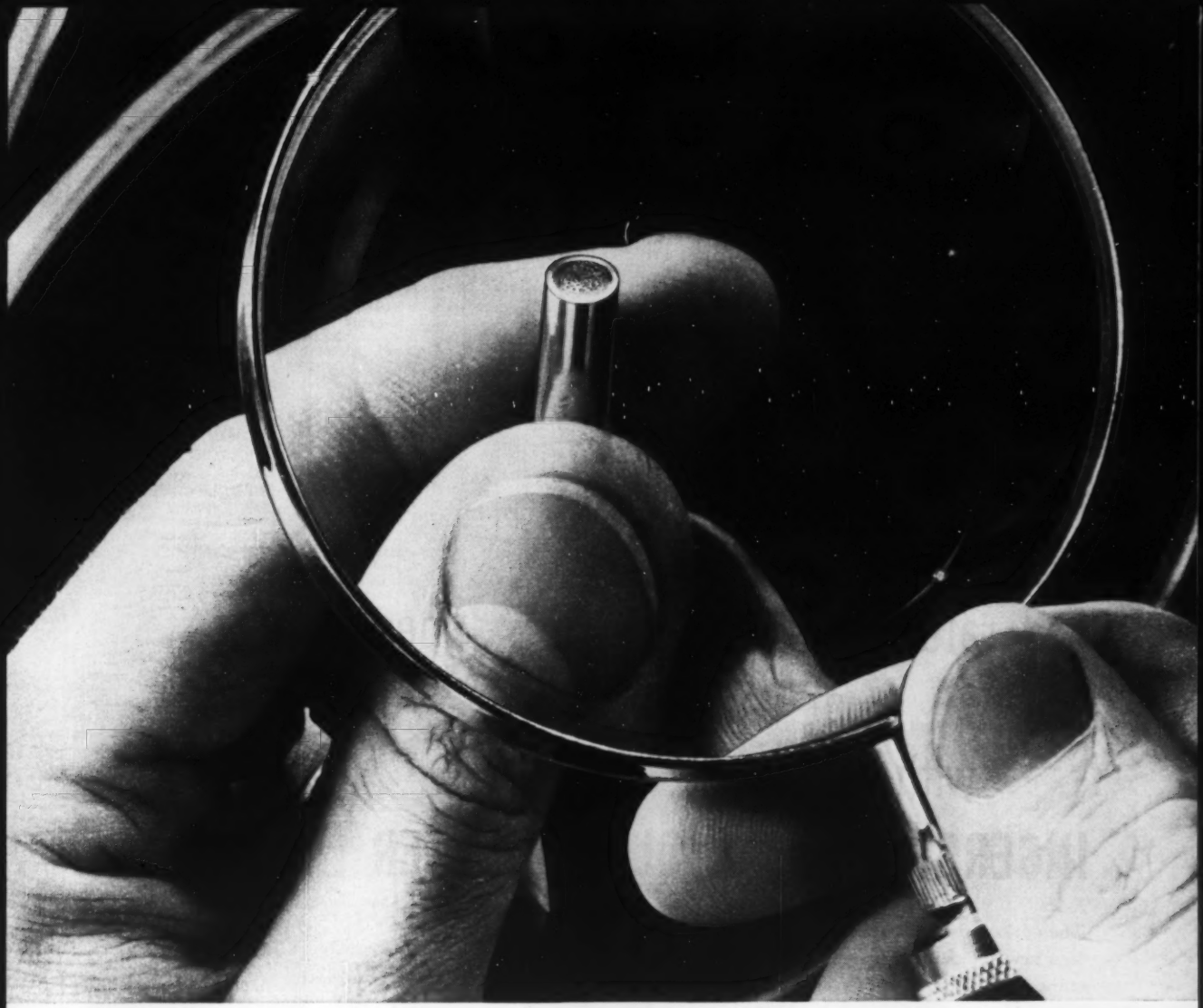

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● National-Standard Copperply is unique because its heavy copper jacket is bonded to a steel wire core by a continuous *electroplating* process. This results in precise concentricity and permits closely controlled coating thickness. It also permits the use of core steels in a wide range of analyses.

The coating is so uniform and the bond so permanent that Copperply can be twisted, bent, flattened, stranded, woven or even roll-threaded without the slightest danger of rupturing the coating or otherwise exposing the core. Thus Copperply's extreme uniformity and permanence mean prolonged service life and maximum protection against rust, regardless of forming or service requirements.

The uses for this unique new wire are many. They range from high strength communications line and electronic applications to wire for non-rust masonry ties and decorative jewelry chain—*wherever* the combined qualities of copper and steel can work to advantage.

Name the use you have in mind and let National-Standard help you work out details. It's part of our unusual service.

NATIONAL NS NATIONAL-STANDARD Company NILES, MICHIGAN **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *tire wire, stainless, music spring and plated wires* • **WORCESTER WIRE WORKS, Worcester, Mass.;** *high and low carbon specialty wires*
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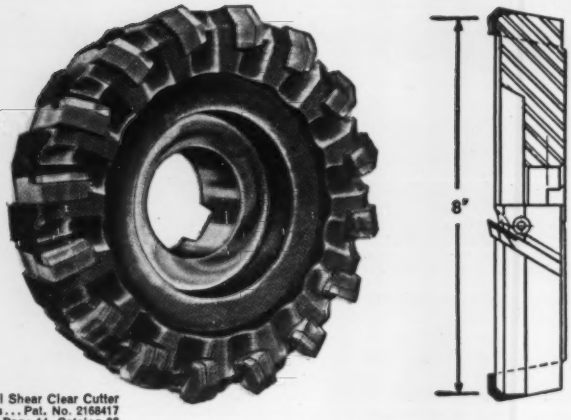


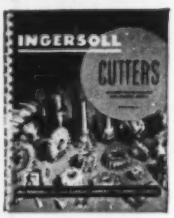
Ingersoll Shear Clear Cutter
27600 series ... Pat. No. 2168417
Page 14, Catalog 66

Feed rate increased 2½ to 5 times at Vaughn with this INGERSOLL SHEAR CLEAR® CUTTER

The cutter previously used was nullifying the investment in a new standard, knee-type milling machine. The machine had more power than was being utilized. The feed rate was only 12″ per minute. The change to Ingersoll Shear Clear permitted the Vaughn Machine Company, Cuyahoga Falls, Ohio, to capitalize on its machine investment and obtain the economy and efficiency of increased feed rate. A feed range of 30″ to 60″ per minute, when milling rough forgings and steel castings, is now continuously maintained.

Ingersoll inserted blade cutters are used on all makes of machines for milling and boring a wide range of materials. An Ingersoll Cutter Division representative will be glad to discuss this and other feed rate experiences with you.

Whether you are concerned with feed rates, longer tool life, finish or cutter costs, the new Ingersoll cutter catalog will be a valuable guide. Write Department **66V.**



Use this new 82 page guide for selecting the right inserted blade milling and boring cutters for your work. Write for catalog #66, today.

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AMERICAN MACHINE & FOUNDRY CO.

AMERICAN MOTORS CORP.

BRIDGEPORT BRASS COMPANY

BROWN & SHARPE MFG. CO.

CINCINNATI MILLING MACHINE CO.

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DE LAVAL STEAM TURBINE CO.

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KAISER ALUMINUM & CHEMICAL CORP.

NORTON COMPANY

UNITED STATES STEEL CORP.

VAUXHALL

CUTTER DIVISION

THE INGERSOLL MILLING MACHINE COMPANY

ROCKFORD ILLINOIS

CALENDAR
OF MEETINGS

Mar. 4-6, Association of Iron & Steel Engineers: Annual western meeting, St. Francis hotel, San Francisco, Calif. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Mar. 5-7, American Machine Tool Distributors Association: Spring meeting, El Mirador hotel, Palm Springs, Calif. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Mar. 5-7, Society of Automotive Engineers Inc.: National passenger car, body and materials meeting, Sheraton-Cadillac hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 6-8, Pressed Metal Institute: Annual Spring technical meeting, Carter hotel, Cleveland. Institute's address: 3673 Lee Rd., Cleveland 20, O. Managing director: H. A. Daschner.

Mar. 10-13, National Association of Waste Material Dealers Inc.: Annual convention, Conrad Hilton hotel, Chicago. Association's address: 271 Madison Ave., New York 16, N. Y. Managing director: Clinton M. White.

Mar. 11-15, National Association of Manufacturers: Institute on industrial relations, Hollywood Beach hotel, Hollywood, Fla. Association's address: 2 E. 49th St., New York 17, N. Y. Information: Sybil S. Patterson, associate director, Industrial Relations Division, National Association of Manufacturers.

Mar. 11-15, 1957 Nuclear Congress: Convention Hall, Philadelphia. Co-ordinator: Engineers Joint Council, 29 W. 39th St., New York 18, N. Y.

Mar. 13-15, National Fluid Power Association: Annual meeting, Hollywood Beach hotel, Hollywood, Fla. Association's address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

Mar. 13-15, Radio-Electronics-Television Manufacturers Association: Spring meeting, Sheraton Park hotel, Washington. Association's address: 777 14th St. N.W., Washington 5, D. C. Secretary: James D. Secrest.

Mar. 14-15, National Industrial Conference Board: Atomic energy conference, Benjamin Franklin hotel, Philadelphia. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Mar. 17-19, Steel Founders' Society of America: Annual meeting, Drake hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George K. Dreher.

Mar. 18-21, Society of the Plastics Industry Inc.: Annual national conference and plastics exposition, Biltmore hotel and Shrine Hall, Los Angeles. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Mar. 18-21, American Society of Mechanical Engineers: Gas turbine power conference, Sheraton-Cadillac hotel, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Mar. 20-22, Society of Automotive Engineers Inc.: National production meeting and forum, Hotel Statler, Buffalo. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 25-27, American Society of Tool Engineers: Annual meeting, Shamrock hotel, Houston. Society's address: 10700 Puritan Ave., Detroit 21, Mich. Executive secretary: Harry E. Conrad.

Mar. 25-29, Western Metal Congress & Exposition: Biennial exposition, Pan-Pacific Auditorium, Los Angeles. Information: American Society for Metals, 7301 Euclid Ave., Cleveland 3, O. Managing director: William H. Eisenman.

Mar. 25-29, American Society for Metals: Biennial technical meeting, Ambassador hotel, Los Angeles. Society's address: 7301 Euclid Ave., Cleveland 3, O. Managing director: William H. Eisenman.

Planning to install high pressure lines in your plant? Will they carry hot corrosive liquids or gases?

You will find SAFETY in DURASPUN Centrifugally Cast Pipe. It's very strong, with strength approaching that of forged steel. It can be alloyed to give you maximum resistance to the heat and corrosion to be encountered.

.it's alloyed to resist corrosion and high temperature

DURASPUN Pipe comes in a wide range, as follows:

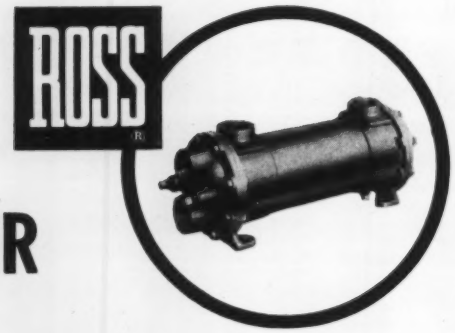
Outside Diameter	Minimum Wall	Length
2½" to 3"	1/4"	88" maximum
3" to 6" Inclusive	5/16"	110" maximum
Over 6" to 12" Inclusive	3/8"	168" maximum, 24" minimum
Over 12" to 14" Inclusive	7/16"	168" maximum, 24" minimum
Over 14" to 20" Inclusive	1/2"	180" maximum, 48" minimum
Over 20" to 24" Inclusive	1/2"	88" maximum
Over 24" to 32" Inclusive	5/8"	80" maximum

This is standard piping. Special cylindrical shapes in comparable high alloy steel can be cast centrifugally . . . retorts, furnaces, fractionaters and other such equipment come in this class.

Write us about your requirements. Our metallurgists backed by thirty-five years of experience will be glad to help select the best combination of alloying elements to take care of your operating conditions.

THE DURALOY COMPANY

OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 332 South Michigan Avenue



ROSS EXCHANGER

conditions this Loewy Forging Press to deliver its full, 2000-ton wallop!

Courtesy Loewy-Hydropress Inc., New York

Forging blooms in specialty alloy steels, this Loewy Hydropress slams down its 2000-ton fist with consistent force at high speeds.

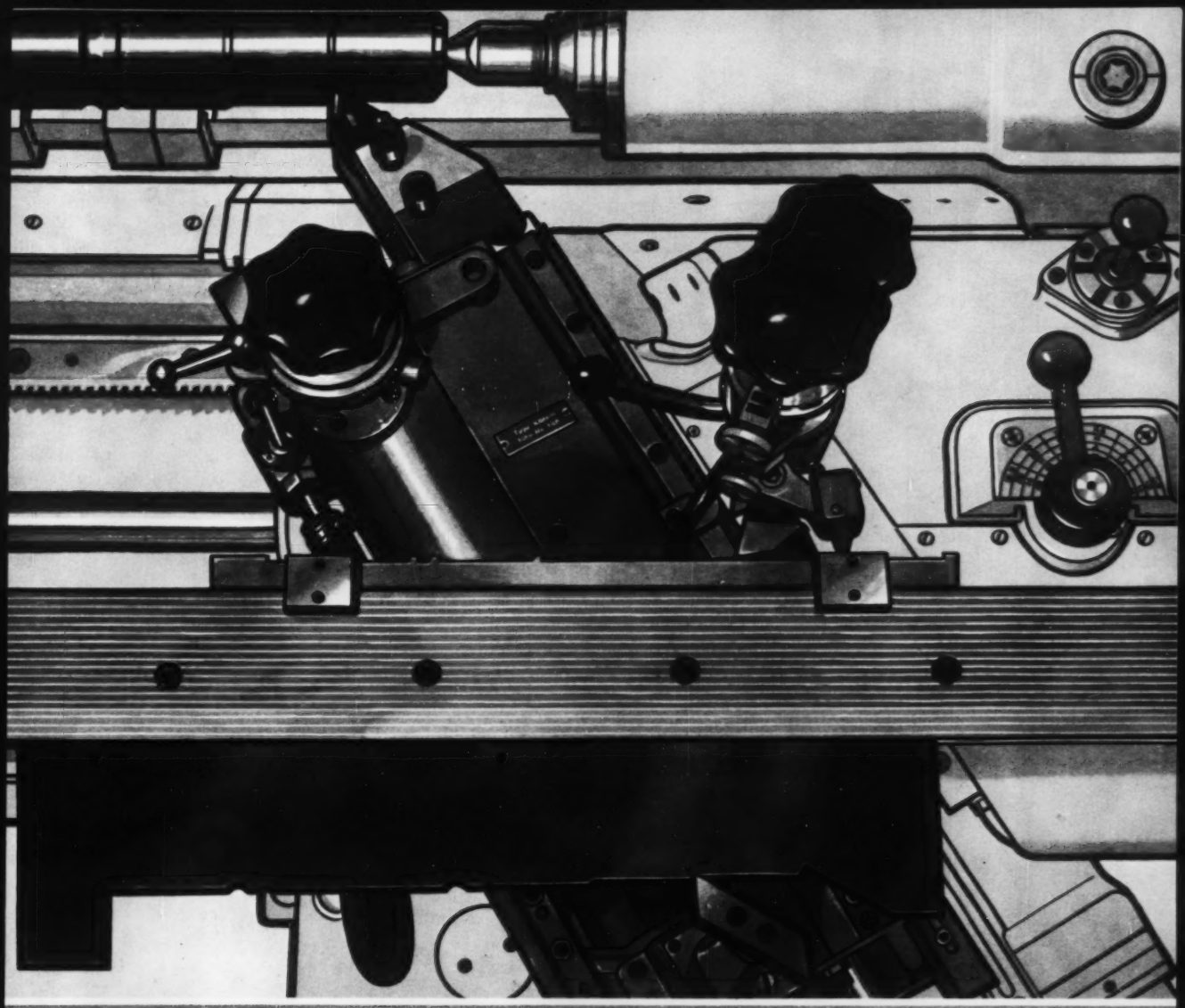
To maintain peak capacity of the hydraulic power system, a Ross Type BCF Exchanger was installed as original equipment. Its efficient performance dissipates hydraulic heat, assuring full-rated power at all times. This press is conditioned for the job.

Throughout the industry, Ross Exchangers are favored by numerous manufacturers building hydraulic machinery of every description. There are many solid reasons for this preference, including: (1) *Ruggedness*—The ability to take the punishing shock of sudden hydraulic surges. (2) *Thermal Efficiency*—Unsurpassed by any other heat exchanger design. (3) *Standardization*—Pre-engineered and mass produced parts permit economic manufacture in a wide range of sizes to answer most needs. (4) *Engineering Cooperation*—Ross representatives have a reputation for helpful consultation and practical recommendations.

For detailed information on how Ross Exchangers can help you meet your heat transfer requirements, request Bulletin 1.1K5. Ross Heat Exchanger Division of American-Standard, Buffalo 5, N. Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.

ROSS HEAT EXCHANGER

Division of AMERICAN-Standard



New Britain +GF+ outproduces multi-tool lathes with a single tool

How can one tool outproduce several? The answer is — maintain dimensional relationships with a template or prototype instead of a multi-tool setup. This cuts tool changeover time to practically zero.

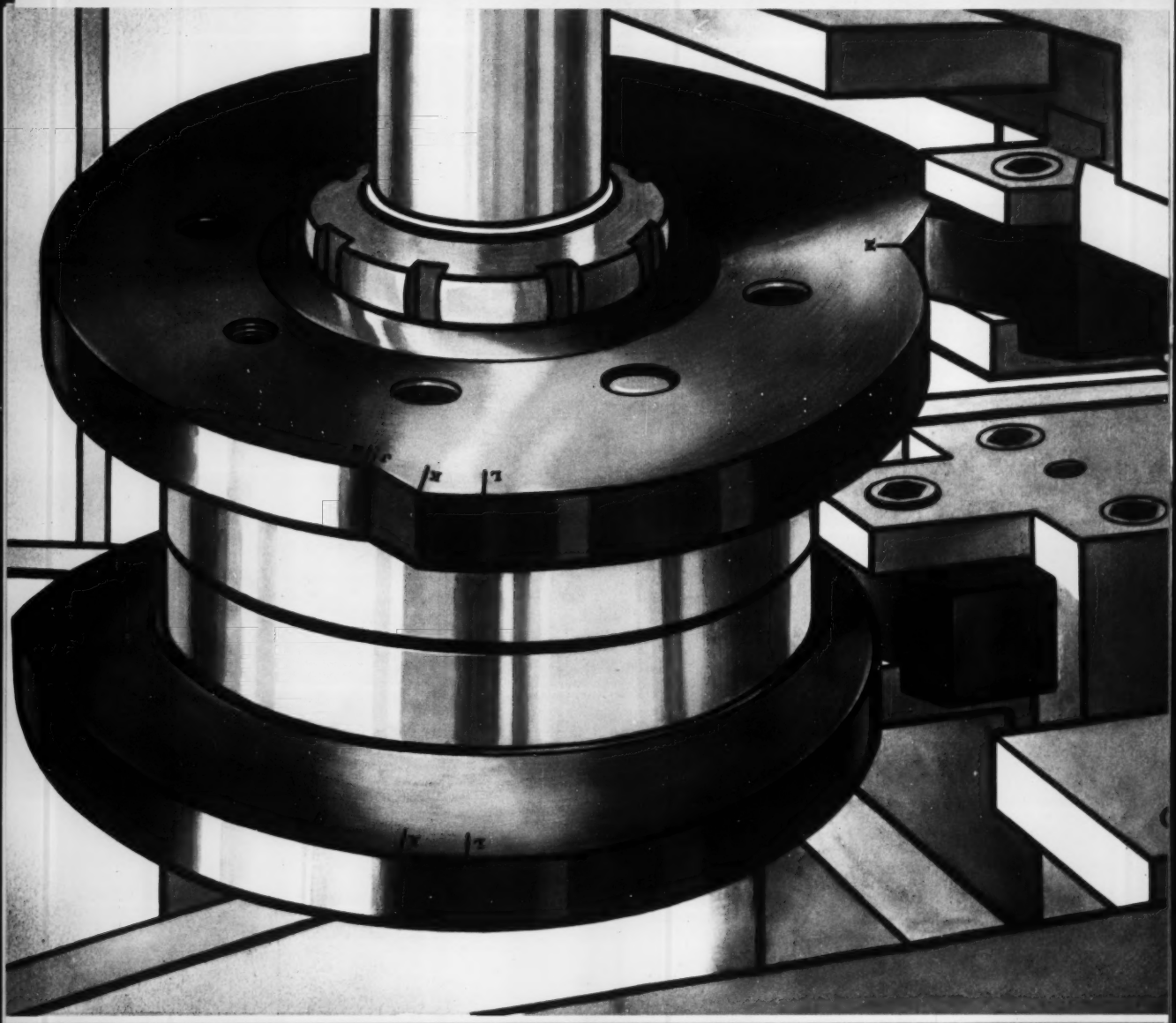
On the New Britain **+GF+** copying lathe, you can cut at maximum speeds and feeds for tool efficiency without worrying about tool wear and the delicate readjustment of several cutting tools. When the tool wears, change it, bring one dimension to size. The other dimensions have to be right. Your choice of a New Britain **+GF+** means elimination of any extra operation to bring pieces within grinding tolerances.

Machines from New Britain's three machine tool divisions incorporate the *basic principles* of more profitable production.

THE NEW BRITAIN MACHINE CO.

New Britain **+GF+**
Copying Lathe

NB



cams put the precision in precision boring

When you are working to "tenths" cams are your best method of maintaining accuracy, because cam control of the tool is *positive* control. The accuracy of parts produced on New Britain boring machines *can't* be affected by variable hydraulic pressures, ambient temperature, or play in complicated linkages.

In boring machines or *any* machine tool investment, be sure your most important requirements are met, not by gadgets, but by the fundamental design principles employed. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

THE NEW BRITAIN MACHINE CO.
Precision Boring Machine
NB

TODAY'S NEW AUTOMOTIVE DESIGNS DEMAND THE BEST STEEL OBTAINABLE

Youngstown Sheets and Strip

Detroit's high-speed automobile body presses are busier than ever turning out body components for today's modern-design cars. More intricate door and fender sections of the new models demand a steel of the highest quality that can take the required deeper draws in its stride. Without question, that steel is Youngstown Cold Rolled Sheets and Strip—the best available anywhere.

Youngstown blends the required combination of surface finish, tensile strength and ductility into every sheet, to provide you almost continuous pressings of even the most difficult-to-form parts. Also, metallurgical quality never wavers from Youngstown's high standards because all operations from ore mining to shipping dock are rigidly quality-controlled by experts with over half-a-century of steelmaking know-how.

On your next order specify Youngstown Cold Rolled Sheets and Strip and join the ranks of our satisfied customers who tell us: "Our production's up—Rejects down—Fabrication costs lowered."

Why not call your nearest Youngstown District Sales Office today, for metallurgical aid or additional information—or write directly to our Home Office.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

Producers of Quality Carbon and Alloy Steels for Over Half-a-Century

QUALITY YOUNGSTOWN SERVICE

wires that fish

In addition to wire for the traditional bent pins, CF&I-Wickwire makes a wire that's a real pro at fish catching. It's the special spring steel wire used to make fish hooks. Heat treated so it's soft and ductile, this high carbon steel wire can be severely deformed by fish hook makers, then heat treated again to give the finished hook a spring-like quality and hardness.

Chances are you don't need wire to make either pins or fish hooks. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

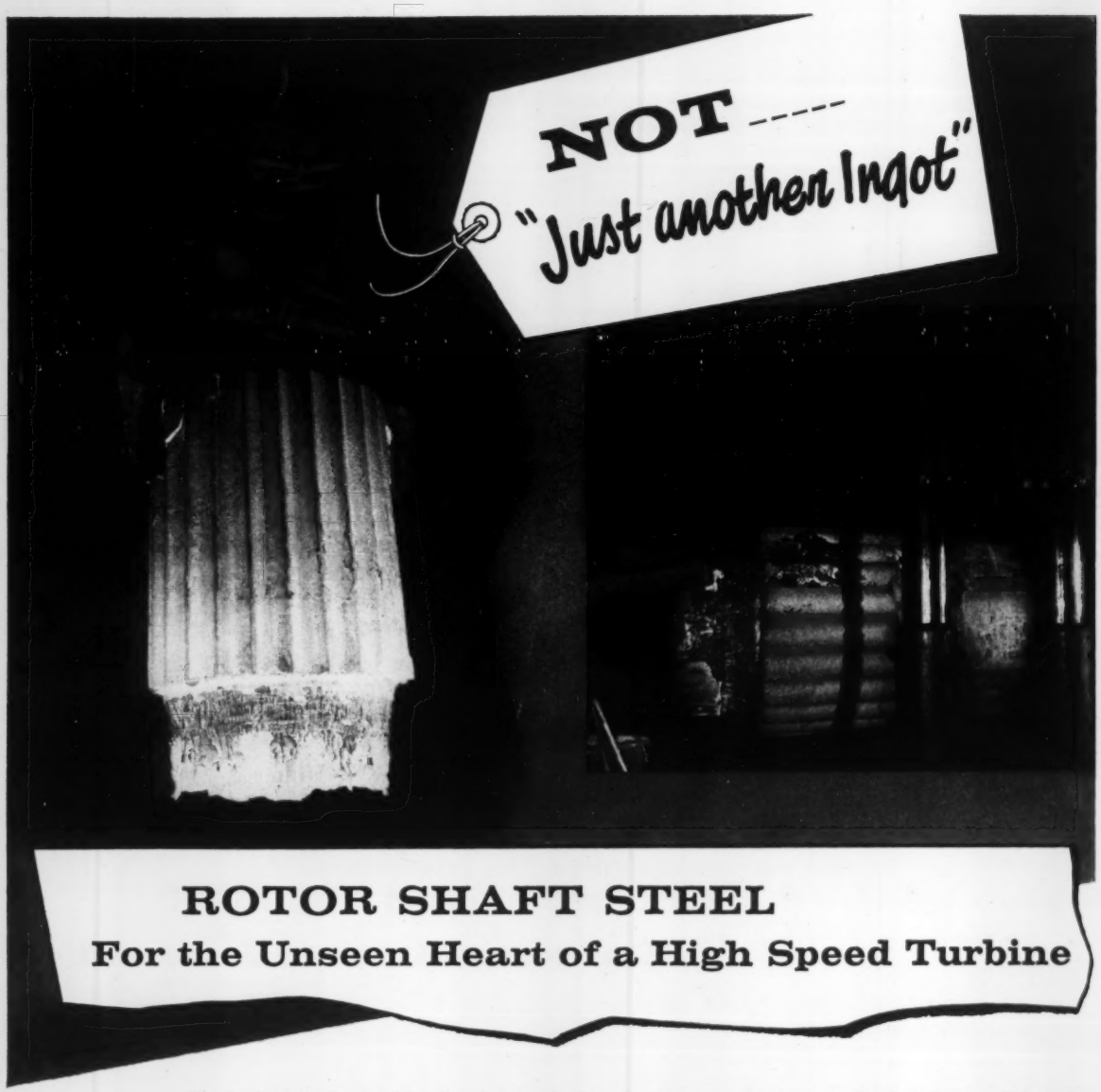
MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Oklahoma City • Phoenix Pueblo • Salt Lake City • Wichita • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland San Francisco • Seattle • Spokane • WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo Chicago • Detroit • New Orleans • New York • Philadelphia • CF&I OFFICES IN CANADA: Montreal Toronto • CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

4240



ROTOR SHAFT STEEL

For the Unseen Heart of a High Speed Turbine

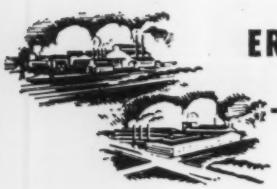
In the heart of a turbine is a huge, single piece, forged rotor shaft.

It takes a combination of skillful, reliable men, and the finest equipment to produce the superior quality, strength and soundness required by these large, fast-rotating forgings. The Erie Forge & Steel Corporation's Research and Development program has the responsibility from selection of raw materials, through melting, forging, heat treating, machining and testing to make quality ingots and forgings that easily meet the greater technical perfection imposed by the Electrical Industry.

This 90" diameter ingot, of high alloy steel, weighs approximately 230,000 pounds. It will be forged on this giant forging press to produce a finished machined turbine rotor shaft, weighing approximately 70,000 pounds.

Here is evidence of the capabilities offered you at Erie Forge & Steel Corporation.

Place your requirements with us, fully confident of the desired results.



ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE

ERIE FORGE & STEEL CORPORATION

FOR QUALITY THAT PAYS OFF

on the production line specify—

SEALMASTER

BALL BEARING UNITS

for the machinery you build or buy!

ZONE HARDENING—Provides positive race-to-shaft locking, eliminating shaft wear and reducing fretting corrosion.

LAND-RIDDEN BALL RETAINER—Spaces balls accurately for proper distribution of radial and thrust loads—traps grease and prevents "churning" of grease.

LABYRINTH SEAL—Keeps dust, dirt out—lubrication in.

LOCKING PIN & PERIMETER DIMPLE—Assures positive lubrication while permitting several degrees of misalignment in any direction. Misalignment of shaft cannot interfere with effectiveness of seal.

Today's production machinery has become larger, more complicated and more expensive. Most machines feature automation and are designed to relieve man of much of the effort and fatigue formerly required to operate and keep them operating continuously. If "downtime" is to be kept at a minimum and fast precision production is to be maintained, precision components logically fit into the picture. The more highly mechanized machinery becomes, the more important is the exclusive combination of features provided in SEALMASTER Ball Bearing Units. These features assure new high standards of bearing performance. You'll want full information on these and other SEALMASTER features.

SEALMASTER BALL BEARING UNITS

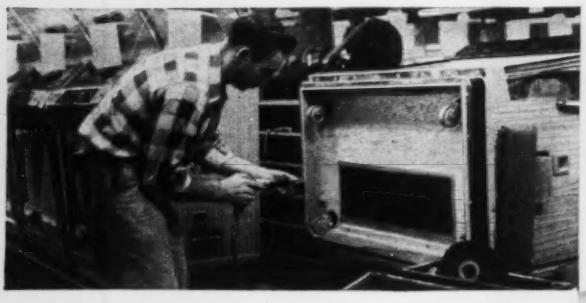
Write for Bulletin 454

SEALMASTER BEARINGS A DIVISION OF STEPHENS-ADAMSON MFG. CO. • 99 RIDGEWAY AVE., AURORA, ILLINOIS

here's how Seeburg matches P-K® fasteners to the job

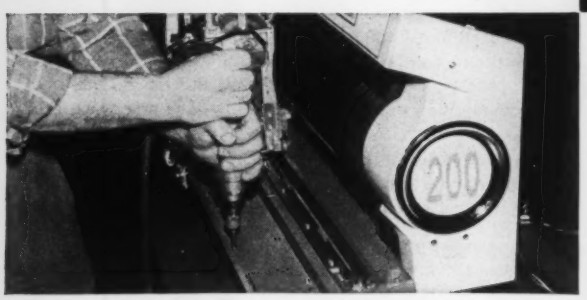
And Parker-Kalon's wide range of types and sizes makes it possible

"By carefully selecting the right P-K screw for each assembly we've reduced rejects and stepped-up production," says Joseph Kamys, engineer of J. P. Seeburg, manufacturers of the famous line of Select-O-Matic "200" Coin Operated Phonographs.



◂ "Take the fastening of metal kickplates and base moldings to wood cabinets, for example. They must hold permanently and go in fast without splitting the wood. P-K Type-A Self-tapping Screws are just right for the job."

"In a metal-to-plastic application such ▸ as the fastening of high-frequency speakers to formed plastic housings—P-K Type-Z thread-forming Screws go in right without cracking the plastic—stay put, even under high vibration."



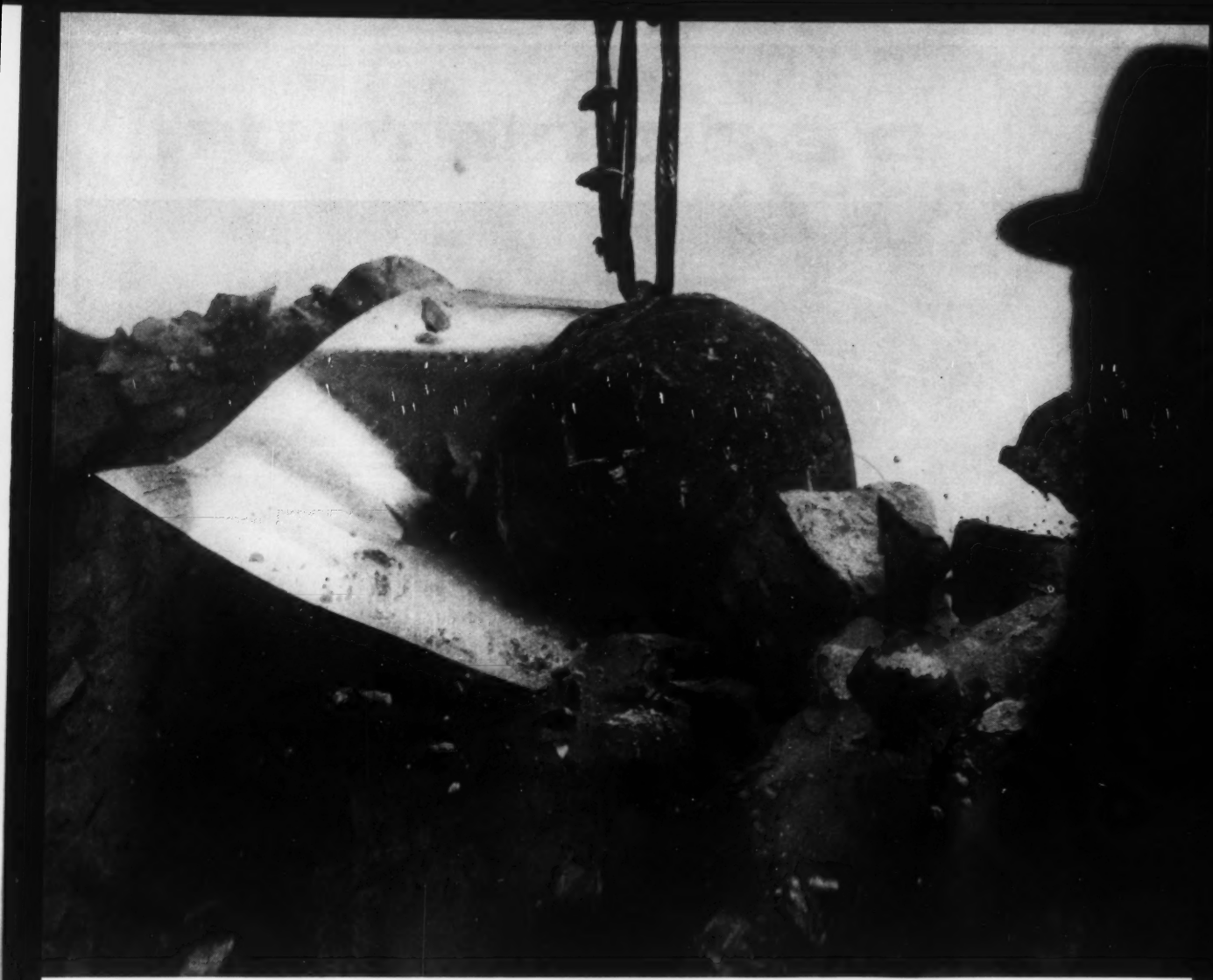
◂ "In this important subassembly, appearance is important as well as dependable holding power. Here we use P-K Type-A Phillips Recessed Head Screws in a metal-to-metal application."

Whatever your product or application . . . ferrous or non-ferrous castings, sheet metal or structural steel, plywoods, asbestos compositions, pliable or brittle plastics . . . Parker-Kalon can furnish the proper fastener to speed assembly, reduce rejects, cut costs!

PARKER-KALON®
fasteners

Sold Everywhere Through Leading Industrial Supply Distributors.

***PARKER-KALON DIVISION,** General American Transportation Corporation. Factory: Clifton, New Jersey.*



THEY SMASHED INTO THAT WEIRKOTE® TILL WE COULDN'T STAND IT!

When a half-ton steel wrecking ball smashes broadside on target—mister, that's a *test*.

Yet, when Weirkote zinc-coated steel is put through that, or equally brutal punishment, its zinc coating stays skin-tight throughout the ordeal.

Think of that demonstration in terms of *your* products, production steps and cost problems.

Weirkote's continuous-process zinc coating *thrives* on toughest fabrication steps—spinning, deep drawing, roll forming, extrusion. And there's no flaking or peeling.

With Weirkote, you can eliminate the cost of plating, painting or redipping after fabrication. In many instances, you'll get prolonged die life, too, due to the lubricating quality of Weirkote's zinc coating.

Free Weirkote Booklet

Send for the new booklet on Weirkote today. Write Weirton Steel Company, Dept. B-6, Weirton, West Virginia.

WEIRTON STEEL COMPANY

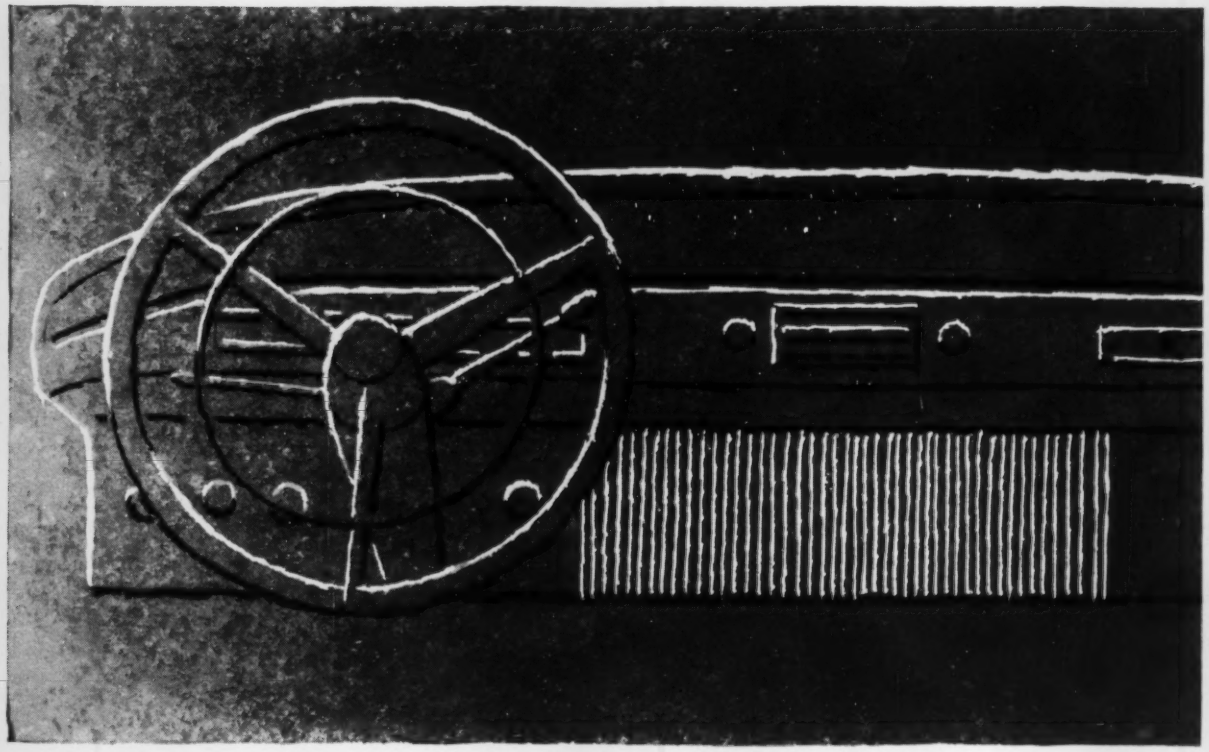
WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

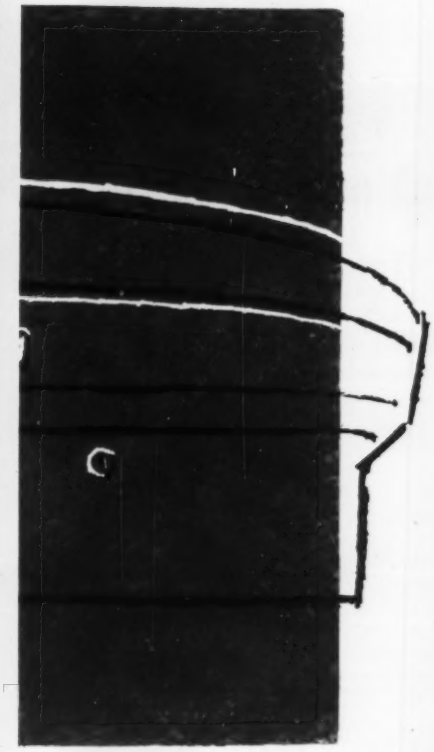
NATIONAL STEEL CORPORATION

DECORATION



UNITED STATES STEEL

that can't fall off, rub off, or chip off!

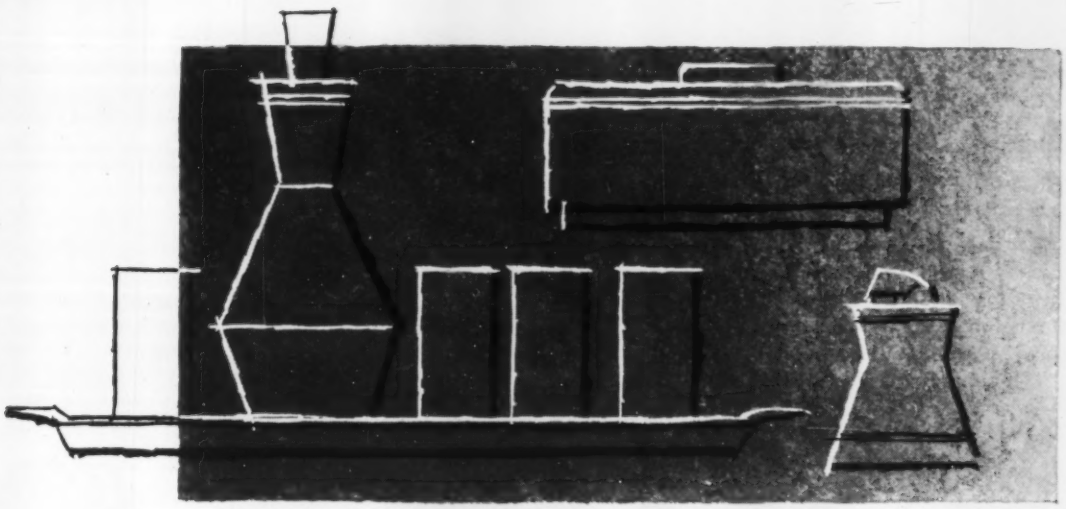


EMBOSSED STRIP STEEL

Embossed strip steel—with the pattern built right in the steel—is an exciting and salable way to decorate products of steel. It is a way to add durable texture to an automobile dashboard, distinctive pattern and design to an automatic toaster. It is a way to add permanent charm and character to hinges, escutcheons, or other hardware items.

It is the low-cost way to dress up a product, because you don't have to apply the pattern. It is right in the raw material, put in at the steel mill. And put in to stay.

Tailored to your product! Amerstrip steel—either embossed or plain—is always tailored to a specific use. You get the exact shape, finish, ductility and other characteristics that you need. As a result—you can often build a better product, more economically, by making it from Amerstrip.

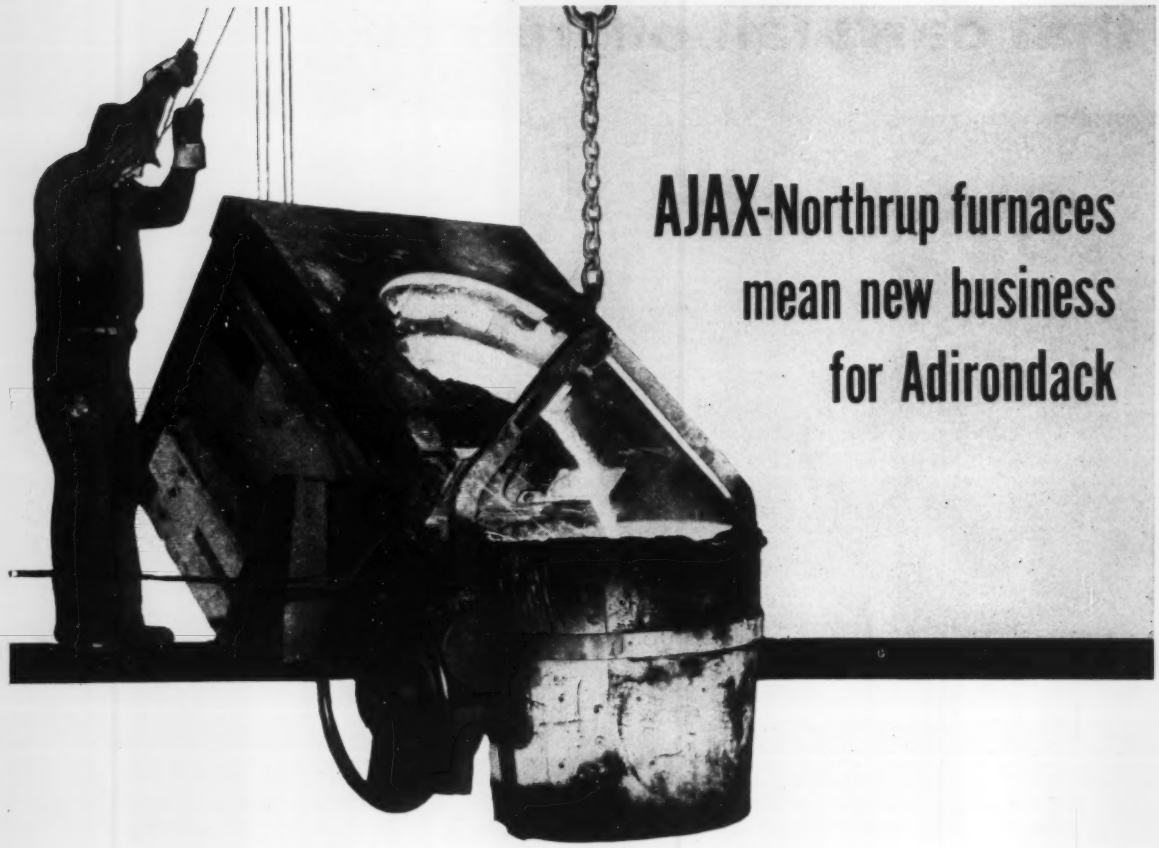


Call any sales office of American Steel & Wire for more information about the availability and uses of Amerstrip in carbon, alloy, or stainless grades.

AMERICAN STEEL & WIRE DIVISION • UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

S T E E L

AMERSTRIP



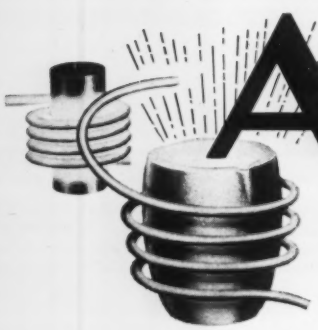
AJAX-Northrup furnaces mean new business for Adirondack

Three new Ajax-Northrup furnaces are *more* than paying their way at Adirondack Foundries and Steel Company, Watervliet, New York. Less than six months after installation, they opened a new half million dollar a year market, with promise of even doubling *that*.

Adirondack could easily handle the largest jobs in arc furnace steel, but not the low carbon, high alloy types. That's why The Company turned to Ajax-Northrup induction furnaces . . . the one efficient method of accurately melting these metals. Three Ajax-Northrup high-frequency induction furnaces with capacities of 2,000 lbs., 1,000 lbs., and 300 lbs. powered by a single 350KW generator met the need exactly.

From the start, Adirondack enjoyed fast melting under close control, low alloy losses, and amazing economy . . . economy that permitted the foundry to take, profitably, more than half a million dollars new business. The advantages of Ajax-Northrup induction melting equipment can be realized in your foundry, too, whether ferrous, non-ferrous, or both. Write Ajax Electrothermic Corp., Trenton 5, New Jersey, for additional details in Bulletin 27-B.

Associated Companies: Ajax Electric Company — Ajax Engineering Corporation



AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

The Timken Company Reports:

"ORZAN A ELIMINATES SILICA DUST!"

● To avoid dangerous dust concentration in the air from handling silica brick, The Timken Roller Bearing Company of Canton, Ohio, has developed a simple, inexpensive process for treating silica brick with ORZAN A. After more than six months' experience, their engineers report:

(1) *Entire absence of silica dust in brick laying area.*

(2) *No adverse effect on brick life or refractoriness.*

ORZAN A contains no alkali, leaves no harmful residue. Except for a minor 0.9% of its original weight, ORZAN A burns out completely.

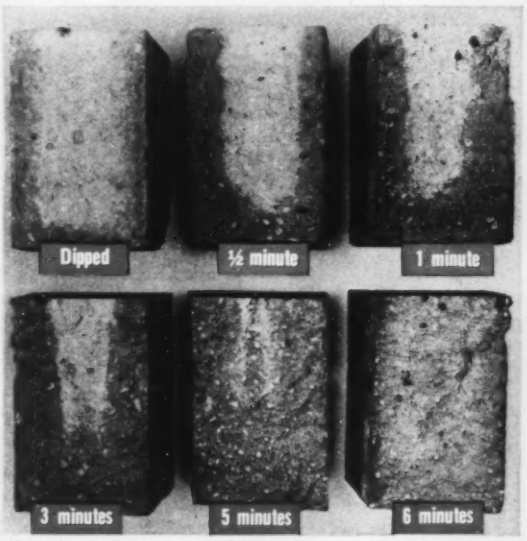
PROCESS: Bricks in original stacks on pallets are dipped into a solution of ORZAN A (1 pound per gallon water). Each pallet takes 45 seconds, in and out. Bricks may be installed wet or dry. The pleasant odored ORZAN A solution penetrates to the innermost brick on the pallet and dries to a dustproof resinous coating on all surfaces.

The dipping operation is quite simple. It requires only a small investment in the amount of equipment needed. Cost of treatment is less than a half cent per brick. Possible abrasion of the brick coating by rough handling during transit is also eliminated.

ORZAN is the registered trademark for surface active lignin sulfonate chemicals derived from the non-cellulose portion of the tree by Crown Zellerbach Corporation.

For detailed application instructions based on the successful process used by The Timken Roller Bearing Company, a free sample of ORZAN A, and new 24-page brochure fully describing ORZAN A and ORZAN S, mail coupon at right.

Pallet-load of silica bricks ready for immersion in ORZAN A solution. No rearranging of bricks is necessary.



Above bricks were dipped in ORZAN A and then broken into quarter sections. ORZAN A solution penetrates interior of silica brick in a matter of seconds.

CROWN ZELLERBACH
CHEMICAL PRODUCTS DIVISION

Crown Zellerbach Corporation
Chemical Products Division
Camas, Washington

Please send me
- A 5-lb. sample of ORZAN A ..... ☐
- Instruction sheet "ORZAN A for Silica Brick" .... ☐
- 24-page brochure on ORZAN A and S ..... ☐

Name .....

Firm .....

Address .....

VS-100

new all-electric machine tool feed drive

No pick-off gears or gear changes are necessary with the VS-100. Infinitely variable 100 to 1 speed range offers high speeds for rapid traverse as well as the slowest feed rates.

Feeds may be precisely selected and rapidly changed, even during a cut. The push button operator's station provides easy, instantaneous feed control. This remote station contains controls for start, stop, jog, reverse, and speed changing . . . ideal in pendent station mounting for maximum operator's convenience. Additional functions, such as automatic dwell and automatic feed programming are available for the operator's station.

The VS-100 operates from 220 or 440 volt, single phase, a-c. circuits. Seven sizes are available ranging from ½ thru 4 horsepower. For complete details write for bulletin D-2501. D-1540

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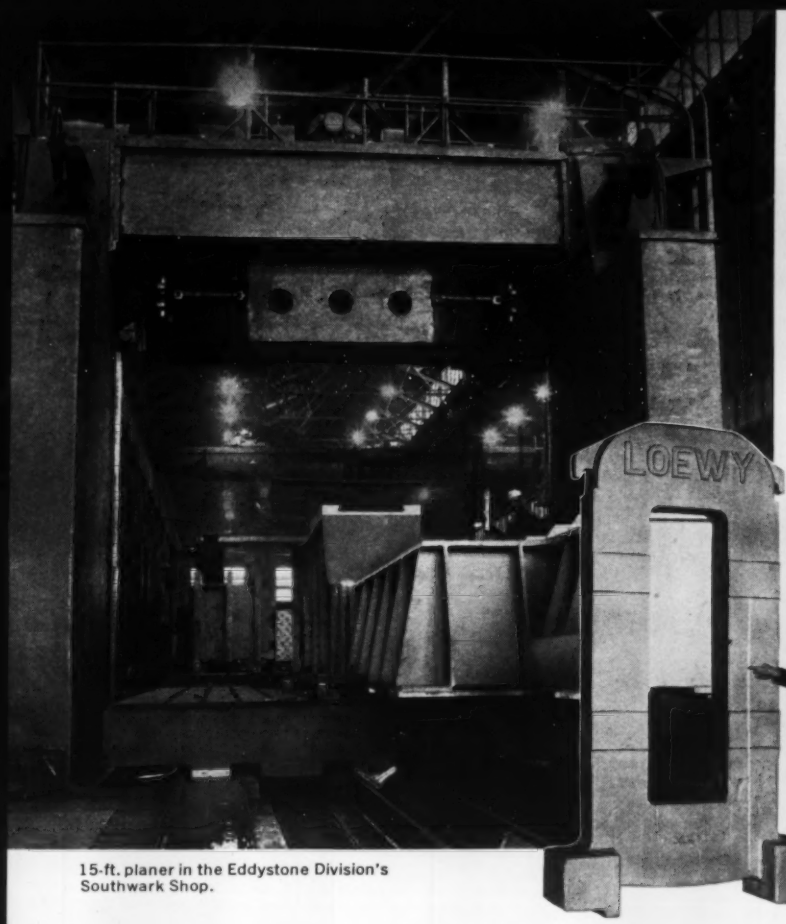

15-ft. planer in the Eddystone Division's Southwark Shop.

General Machine Shop at the Eddystone Division, Eddystone. Pa., whose 1,500,000 square feet of manufacturing space includes huge fabrication shops and a nonferrous castings foundry.

•

Blooming an ingot at the Standard Steel Works Division, Burnham Pa., under one of the 2500-ton hydraulic presses.

Vast, integrated Baldwin-Lima-Hamilton facilities enable Loewy-Hydropress to deliver your rolling mills on time

When Loewy-Hydropress designs and builds your rolling mills, you aren't plagued by the usual troublesome and expensive delivery delay. For Loewy has at its disposal the vast, yet smoothly integrated resources of the entire Baldwin-Lima-Hamilton Corporation.

The two B-L-H divisions called upon most frequently to make parts for Loewy-designed rolling mills are the Standard Steel Works and Eddystone Divisions. The necessary steel components are cast or forged at Standard. And Eddystone, with its extensive machining facilities, supplies the completely finished nonferrous castings and weldments. Other members of the B-L-H family with excellent facilities for producing rolling mill parts are the Hamilton Division, Hamilton, Ohio; the Austin-Western Division, Aurora, Ill.; and the Madsen Division, La Mirada, Calif.

Close coordination among all Baldwin-Lima-Hamilton divisions is the chief reason why Loewy-Hydropress can deliver your rolling mills faster.

To your individual production requirements, we design, build and install hot and cold rolling mills for ferrous and nonferrous metals, continuous merchant and wire-rod mills, skelp mills, two-high and three-high blooming mills, high-speed foil mills, continuous billet and sheet-bar mills, strip, slabbing, plate, structural, rail mills, and special mills. Write us today, Dept. B-3, for illustrated bulletin L-164.

Loewy-Hydropress designers at the company's headquarters in New York City.

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A REPUBLIC PIG IRON METALLURGIST

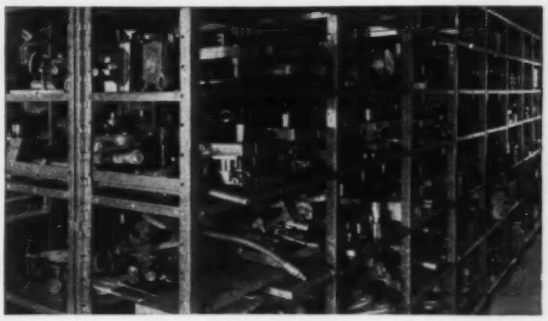
He's right up-to-the-minute on all the latest foundry techniques. He knows all types of irons and their characteristics. Knows what they will do or will not do under certain conditions. His thorough knowledge is based upon a combination of years of actual foundry experience and metallurgical training.

The Republic Pig Iron Metallurgist also has the advantage of being backed by the only producer of a complete line of merchant pig irons—Republic Steel. This is an advantage that he can pass along to you by being in a position to recommend the proper grade of pig iron for a specific job without hesitation or prejudice.

He's a regular and welcome visitor in hundreds of foundries. They rely on him for expert advice on pouring problems, molding practice, improving castings, increasing output, reducing costs.

Have a problem in your foundry? Then ask for the man who knows his irons—call in a Republic Pig Iron Metallurgist. His service is confidential and without obligation. Mail the coupon if you would like him to call at your foundry.

HANDLING PROBLEM? Standard and special units from Republic's complete line of materials handling equipment are solving problems at every stage of production. One company used the PB-120T Box and Skid Units shown above to reduce handling costs 25%, minimize inventory time, provide better visible product identification, free valuable floor space for production equipment. Republic Materials Handling Specialists will help you design units to meet your specific needs. Send coupon for Catalog No. 620.



STORING PROBLEM? Republic Wedge-Lock Steel Shelving solves the problem of storing dies, tools, patterns, etc. This exceptionally strong shelving is designed specifically for high stacking of enormous weights. Joints actually get tighter and stronger as weight increases. There's no sagging, swaying or buckling. Wedge-Lock assembles quickly and easily and is completely flexible to meet changing requirements. It's the answer to maximum loading in minimum floor space. Send coupon for Catalog ES-931.

LIFTING PROBLEM? Republic Chain Slings provide a safe method of lifting heavy and hard-to-manage materials. This new catalog contains complete information and specifications on Republic Chain Slings, Attachments and Accessories. Tells you how to use slings properly to obtain maximum life . . . how to store . . . how to inspect . . . how to order. Send coupon for your copy.

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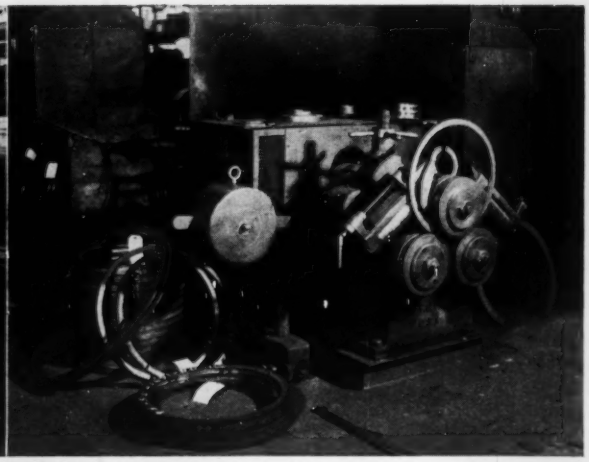
UP TO 104-FT. DIAMETER RINGS for internal bracing of large elevated tanks — cold bent from heavy angles, leg-in, on "Buffalo" No. 3 Horizontal Bending Roll, to fractional-inch accuracy — by a leading fabricator. Machine uses no dies, only standard rolls.



FLATS BENT ON EDGE into spirals, which are then cut to circles and butt-welded — a high-production method used by major motor manufacturer for stator ring output. The "Buffalo" Vertical Bending Roll makes the job easy. Rolls are readily changed, adjusted to the shape and diameter.

"BUFFALO" BENDING ROLLS ARE PAYING THEIR WAY IN DIE-LESS COLD BENDING

If you bend structurals into arcs, circles, spirals or segments in any quantities, there is no cheaper method than with a "Buffalo" Bending Roll. Bridge fabricators, steel mills, heavy equipment builders, aircraft and automotive users — metal working industries by the score — enjoy the ease and speed with which their "Buffalo" Bending Rolls turn out commercially accurate curves.

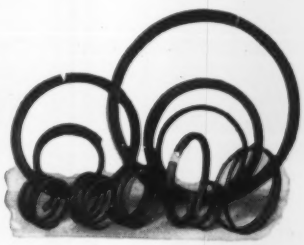
Steel warehouses have brought in profitable, new fabrication business by purchasing a Bending Roll. A mower manufacturer adapted his roll to apply the twist to his reel blades. Many firms use special rolls for 1001 highly specialized operations. All agree on the exclusive "Q" Factor* features of rigid, lasting construction, easy roll changes and diameter adjustments, simple operation requiring no highly skilled personnel — and no expensive die requirements.

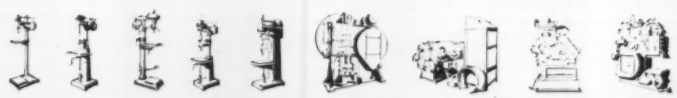
Write for Bulletin 352 and check details on the model to put your bending operations on a paying basis — or bring profitable new business into your plant.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

CONVEYOR MANUFACTURER gets fast output of curved sections involving angles and flats bent into arcs by "Buffalo" Bending Roll.

Any structural shape including tubes and pipes are easily and accurately bent to desired curves.





ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

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Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

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You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J

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No scrap Riveting electrical controls in bakelite cases with the 1-ton Multipress has virtually eliminated breakage for Therm-O-Disc, Inc., Mansfield, Ohio. The press ram automatically reverses when the pre-set pressure of 900 pounds is attained.

Twice the output Three 1-ton Multipresses are used for broaching, burnishing and stripping operations at Lamson & Sessions, Cleveland, Ohio. Production was doubled over previous methods; pinpoint accuracy is obtained with semi-skilled operators.

Higher quality Peening studs less than ¼" long was a ticklish job made easy by the 1-ton Multipress. Health-Mor, Inc., Cleveland, Ohio, manufacturer of vacuum cleaner parts, has found that ease of Multipress operation greatly improves product quality.

Let Multipress point the way to production economy

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METAL QUIZ

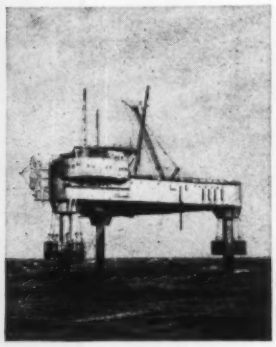
Each of these problems was solved successfully with an Inco Nickel Alloy
Can you tell which one proved to be the answer?

Number the picture captions!

1. **"S" Monel** hard-grade nickel-copper cast alloy
2. **Inco Nickel**
3. **"K" Monel** age-hardenable nickel-copper alloy
4. **Inconel** nickel-chromium alloy
5. **Monel** nickel-copper alloy
6. **Inconel "X"** age-hardenable nickel-chromium alloy
7. **Monel "403"** non-magnetic nickel-copper alloy

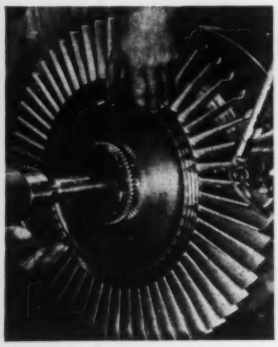
See answers below

☐ **Oil well drill collar**—Needed: non-magnetic metal with high strength. Which Inco Nickel Alloy . . . ?



☐ **Radar platform "leggings"**—Needed: resistance to abrasion and marine corrosion. Which Inco Nickel Alloy . . . ?

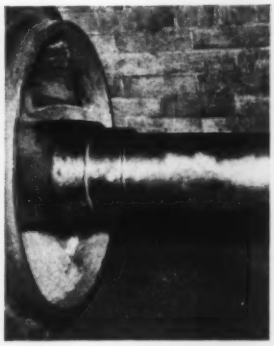
☐ **Jet engine flame tube**—Needed: oxidation and corrosion resistance at jet engine temperatures. Which Inco Nickel Alloy . . . ?



☐ **Gas turbine blades**—Needed: hot strength up to 1500°F., low coefficient of expansion. Which Inco Nickel Alloy . . . ?

☐ **Submarine cable sheathing**—Needed: non-magnetic metal resistant to marine corrosion. Which Inco Nickel Alloy . . . ?

☐ **Ultrasonic drill**—Needed: high magnetostrictive ability to produce ultrasonic vibrations. Which Inco Nickel Alloy . . . ?



☐ **Shaft sleeve for salt water pump**—Needed: extra-hard casting alloy that resists corrosion. Which one . . . ?

You may take this kind of quiz *again* . . . and soon! *Your* design may require a metal that resists corrosion . . . or wear . . . or high temperatures. Or one that meets some destructive *combination* of conditions.

Then look into the Inco Nickel Alloys. First step: send for "Standard Alloys for Special Problems." This fact-filled booklet describes the properties of many useful metals . . . shows just the kind of problem each has solved. Write for a copy . . . do it *now!*

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INCO TRADE MARK

Nickel Alloys

Monel* • "R" Monel* • "K" Monel* • "KR" Monel* • "S" Monel* Inconel* • Inconel "X"* • Inconel "W"* • Incoloy* • Incoloy "T"* Ni-o-nel • Nimonic* Alloys • Nickel • Low Carbon Nickel • Duranickel*

Oil well drill collar: 3. "K" Monel
Radar platform "leggings": 5. Monel
Jet engine flame tube: 4. Inconel
Gas turbine blades: 6. Inconel "X"
Submarine cable sheathing: 7. Monel "403"
Ultrasonic drill: 2. Inco Nickel
Pumps' shaft sleeve: 1. "S" Monel

Metalworking Outlook

More Inflation

Watch for a continuing creep upward in the cost of living index this month. It now stands at 118.2 per cent of the 1947-1949 average, 3.1 per cent higher than in January, 1956. The rise means a wage boost of at least a cent an hour for about 1.1 million workers in the auto, aircraft, farm implement, appliance and electric equipment industries. Those escalator wage boosts, plus automatic increases coming to more than 5 million in 1957, make it tough to comply with the President's request for restraint in wage and price hikes.

Wage Boosts Contribute

The trend is toward substantial increases on negotiated wage adjustments, too. The weighted average thus far this year on negotiated settlements is about 7 cents, but the pressure is for more. At Standard Oil Co. (Indiana), for example, the company on Feb. 1 raised wages for nonrepresented employees by 3 per cent—a boost considered just "under present economic conditions and in line with automatic increases due in other industries." The same offer has been made to union-represented personnel, but they seek a 10 per cent boost and have authorized a strike if necessary. Average refinery worker's pay in Whiting, Ind., is $2.70 an hour.

Optimism at Inland

Inland Steel Co. will pour the 100 millionth ingot ton of steel at its Indiana Harbor, Ind., works this month. The last 10 million tons were produced in 24 months. Because of expansion, the next 10 million will take only 23 months. Says Inland President Joseph L. Block: "Even though there might be some easing in demand, our company would not change its current plans for expansion. Despite some slight easing in the business picture by midyear, I believe 1957 will be excellent for the steel industry. It's likely that a new production record will be attained."

Sign of the Times

Steel production was curtailed at Buffalo last week by a wildcat strike at Colorado Fuel & Iron Corp.'s Wickwire Spencer Steel Division. The district ingot rate fell 7.5 points—to 100 per cent of capacity. Three open hearths and two blast furnaces were affected.

Trouble in Television

Look for a shakeout among television set producers. Layoffs among workers that began last December still continue. Some 2500 General Electric Co. employees making receivers return to work today, but another 1200 are still out. Other manufacturers have had to curtail production, too. On Jan. 31, 2.3 million new black and white sets were unsold, compared

Technical Outlook—p. 93 Market Outlook—p. 149

with 2 million on Jan. 31, 1956, also a time of glut. Market saturation isn't the problem; color and price are the difficulties. Buyers are waiting for color TV, but priced at about $300 or less, compared with the lowest tags of $495 now.

Mergers: Help Not Hindrance?

Mergers accounted for only 6 per cent of the growth in assets of the ten largest corporations between 1920 and 1955, says the U.S. Chamber of Commerce. It concludes: "Available data do not reveal any serious general threat to competition as a result of recent corporate mergers. A strong case can be made that the economy is becoming more competitive in many lines, with recent merger trends a contributing factor."

No Uranium Shortage

"We no longer are concerned over the possibility of a uranium shortage for the government military and power development programs as projected for the next ten years." So says the Atomic Energy Commission. Total domestic reserves of uranium ore, estimated at 60 million tons on Nov. 1, 1956, will be substantially increased by private exploration and development already planned for 1957.

Tariff Troubles in Europe

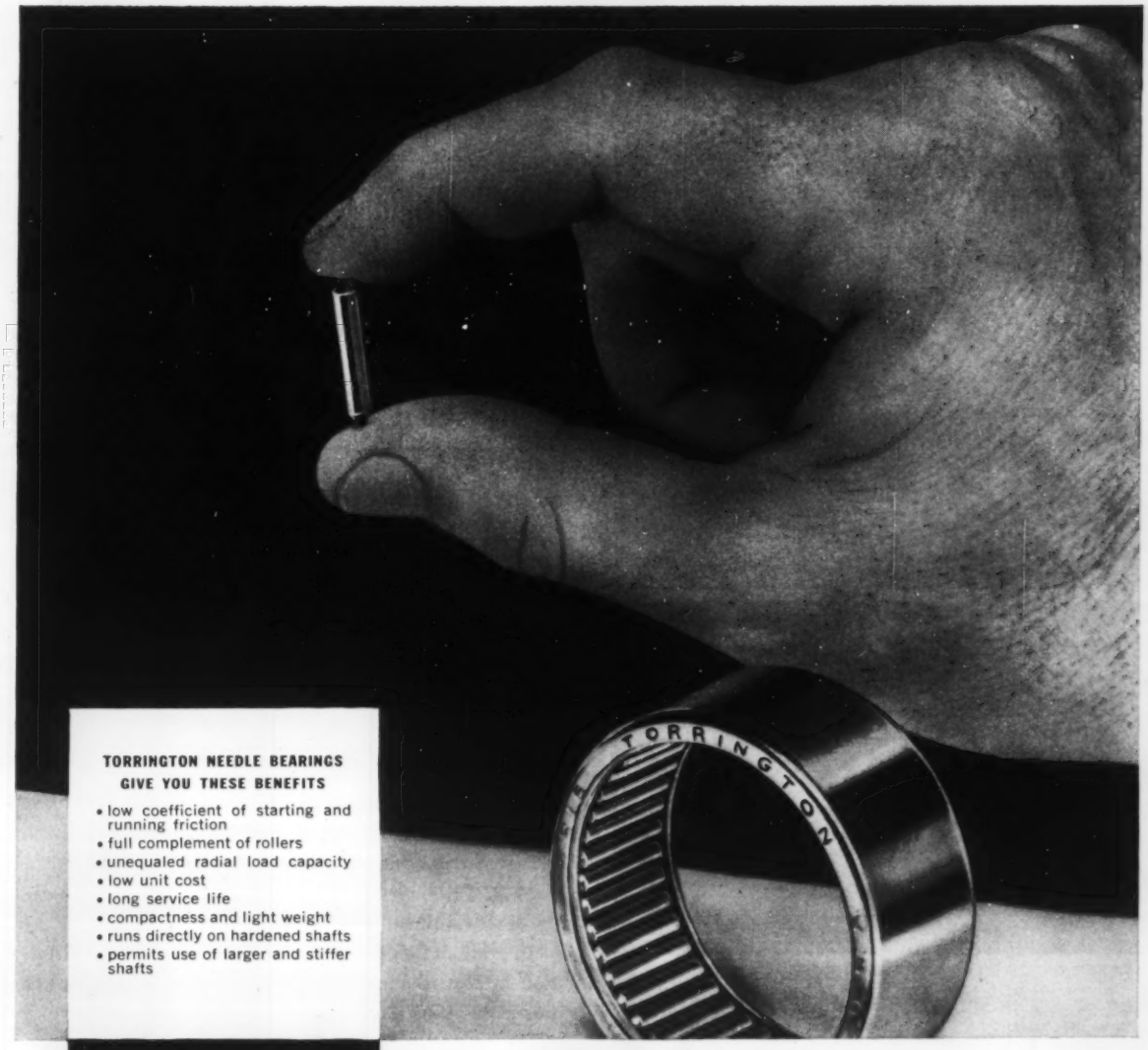
Europe's common market plan may raise some tariff barriers, not lower them. The plan, which has a good chance of approval by the parliaments of West Germany, Holland, Belgium, Luxembourg, France and Italy, also includes a proposal to pool atomic power development. In finding a common ground on tariffs, protectionist France and Italy opposed the low countries which favor low barriers. The compromise will lower French and Italian walls but raise those in Belgium, Holland and Luxembourg—to the detriment of many U.S. traders.

Exports Jump 20 Per Cent

Nonmilitary exports hit $17.3 billion in 1956, up some 20 per cent from 1955, Bureau of Census figures show. Imports increased 10 per cent, to $12.6 billion. Coal and steel scrap exports gained 50 per cent; iron and steel mill products, 20 per cent. Shipments of construction, excavating and mining equipment jumped 50 per cent; other industrial machinery, 20 per cent. Significant import gains were in autos, aircraft, aircraft parts, machinery, nonferrous metals and ferroalloys.

Straws in the Wind

International Nickel Co.'s rolling mill at Huntington, W.Va., has been on strike since Jan. 13 . . . National Lead Co. had its best sales and earnings year in 1956 in its 65-year history . . . Sharon Steel Corp. plans to continue its expansion program which boosted its Roemer Works ingot capacity 20 per cent last year.



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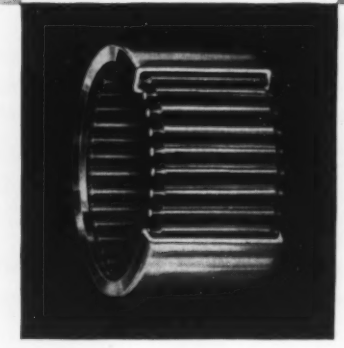

Close-up of precision!

This Needle Roller, key to the operation of the Torrington Needle Bearing, is a microscopically precise example of Torrington craftsmanship.

In every manufacturing step, from selection of bearing materials to final polishing, these rollers are checked with strict quality control.

A full complement of rollers, mounted in a precision-made, case-hardened retaining shell, provides a maximum number of contact lines, giving the Torrington Needle Bearing a higher radial load capacity than any other anti-friction bearing of comparable size. Rollers operate smoothly with low coefficient of starting and running friction.

Torrington's experience with Needle Bearings spans the history of their development for thousands of successful applications. In seeing that you get every last ounce of performance these unique bearings can deliver, your Torrington representative is an expert: call on him at any time. *The Torrington Company*, Torrington, Conn.; South Bend 21, Ind.

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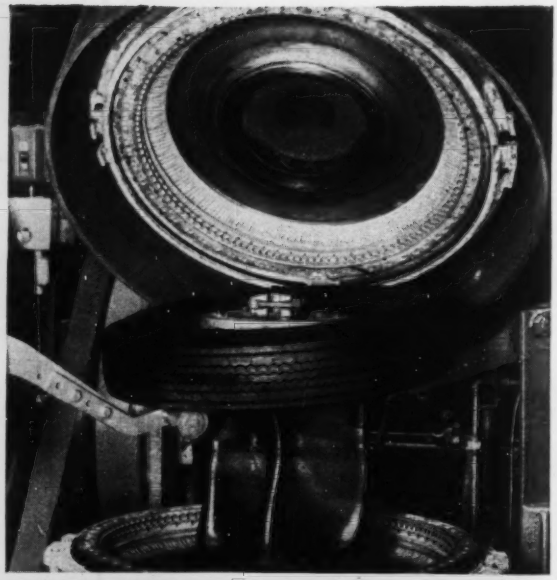

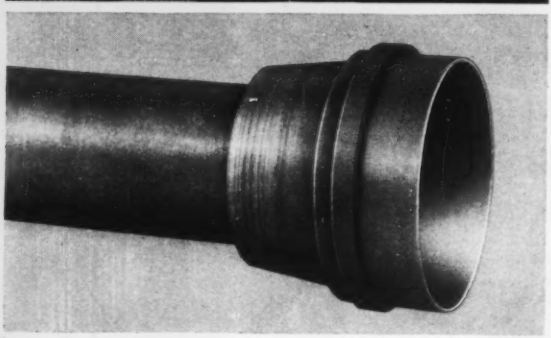

Core of this tire-curing mold is a center cylinder assembly. This unit moves diaphragm and ring, and strips the cured tire from the bottom half-mold as the press opens. With each stroke of the stainless steel piston within the bronze cylinder, the piston ring, made of Armco 17-7 PH Stainless, scrapes the inside of the cylinder free of foreign matter.

Where ordinary steel failed---

Part made of Special Armco Stainless

Fights Rust and Wear--Lasts Longer

Corrosive combinations of steam and sulfur compounds made short work of carbon steel scraper rings previously used in tire-curing presses like this one.

Now, according to the press manufacturer, service life of the scraper ring is "excellent." The reason: Armco 17-7 PH Stainless Steel is now specified.

Here's why rings made of this special precipitation hardening stainless steel last longer.

. . . Resistance of 17-7 PH to wear and corrosion is much greater than that of carbon steel.

. . . 17-7 PH rings are extra hard and tough—resist wear from continual action against cylinder walls.

In addition, ability of this special steel to resist distortion in heat treating helps assure accurate dimensions in this close-fitting part.

Problem-Solving Pair

Armco 17-7 PH and its companion precipitation hardening grade, Armco 17-4 PH, are unique among the stainless steels. Parts can be *finish-fabricated* from these special steels in the annealed condition, then given high strength and hardness by simple heat treatment. 17-7 PH is produced in sheet, strip, plate, bar and wire; 17-4 PH in billets, bar and wire.

For full information about these Armco Precipitation Hardening Stainless Steels, just write us at the address below.

Armco Steel Corporation

1027 Curtis Street, Middletown, Ohio

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Partners in Business

In recent years there has been a growing but unnecessary misunderstanding between big and little business. There is evidence of it in the renewed interest of government investigators and reports coming to this publication.

Some of the misunderstanding can be blamed on the government. It arbitrarily classifies companies with 500 or more employees as "big" and lines them up in opposition to the "little" companies employing fewer than 500.

As a general policy, the government frowns on big companies, smiles benevolently on the smaller ones. It thinks that some companies are getting too big and too monopolistic, especially through the absorption of their smaller competitors. It's what Sen. Joseph C. O'Mahoney's Antitrust & Monopoly subcommittee calls "creeping economic concentration."

The government's inquiry into oil pricing may be the tip-off that other basic industries may be next on the list for price investigations. It also may take a look at the profits of corporate giants.

Some of the misunderstanding also may be laid at industry's own doorstep. Smaller manufacturers see business going to captive plants newly acquired by their big customers. Often they are warned: "If you can't make it at our target price, we will make it ourselves." The smaller manufacturers, too, create their own problems by ruthlessly competing among themselves.

What makes the situation so disturbing is that both big and little business are necessary to our economic health. Only the mass production of the big companies makes possible so much for so many people at such low cost. Yet mass production is dependent on small business because of its specialized know-how, flexibility and lower overhead.

General Motors, for example, buys goods and services from 26,000 suppliers, of which 89 per cent employ fewer than 500 workers; 64 per cent employ fewer than 100. Ford has 20,000 suppliers, Chrysler 12,000.

There is no question about the survival of big business. Neither is there a question about the survival of little business. (New business formations set an annual record of 140,775 in 1956, a monthly record of 14,632 in January, 1957.)

But we would like to ask: Why can't big and little business get a better understanding of each other's problems, learn to live and let live and become better partners? It boils down to a matter of enlightened self-interest. There would be less reason for government interference.

Irwin H. Such

EDITOR-IN-CHIEF

We make them all!

• Here are two examples of washers produced in our plant. The one in the tweezer is used in small electric units. The other is used in the assembly of heavy-duty materials handling equipment. And, here's an amazing comparison: It would take more than 12,000,000 of the tiny washers to match the weight of the BIG washer!

This gives you some idea as to the magnitude of washers covered by our inventory comprising over 100,000 dies which are at your service. What's more, you don't pay one red cent for the use of existing dies. Or, special dies can be made in our own plant to fill your specific requirements. *Moreover, you can count on excelled quality and competitive prices from the world's largest producer of washers.*

Since 1887

• Look to Wrought Washer Mfg. Co. as your No. 1 Source for Washers and Stampings . . . enjoy the benefits which leadership offers you. Write for free copy of our Catalog No. 40.

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the world's largest producer of washers

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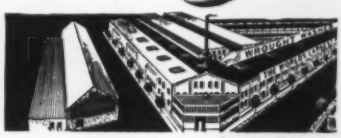

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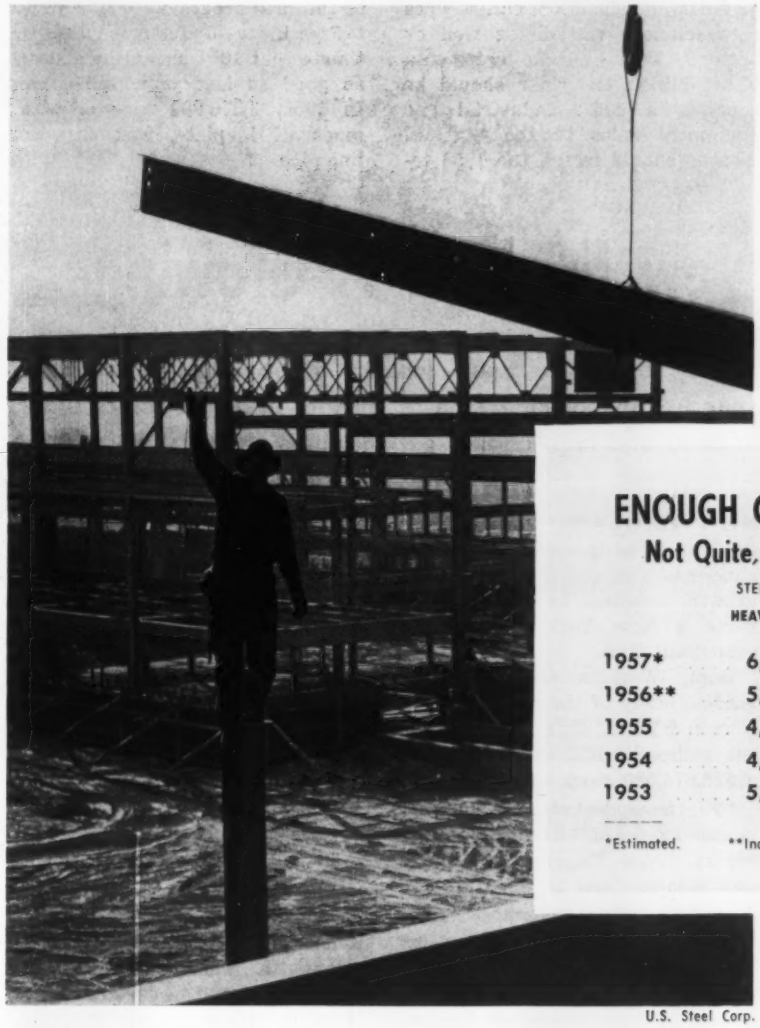


U.S. Steel Corp.

ENOUGH CONSTRUCTION STEEL?

Not Quite, But Situation Is Improving

STEEL SHIPMENTS IN NET TONS

	HEAVY STRUCTURAL SHAPES	STEEL PLATES	REINFORCING BARS
1957*	6,460,000	9,100,000	2,996,000
1956**	5,356,000	7,638,000	2,540,000
1955	4,737,000	6,762,000	2,165,000
1954	4,501,000	5,340,000	1,751,000
1953	5,022,000	7,668,000	1,849,000

*Estimated. **Includes December estimate.

Builders See Relief

Shortages of shapes and heavy plates still hamper some contractors, but deliveries are better. More tonnage to become available as mills step up production

CONSTRUCTION steel shortages will be less serious by midyear. Reasons: 1. More production of heavy plates and shapes, which are still at a premium. 2. Greater availability of light plates and reinforcing bars. 3. Lower order backlogs and quicker deliveries.

Expansion—Steel producers are enlarging facilities to meet the growing demand for plates and structurals. Bethlehem Steel Co.'s expansion program for plates at its Johnstown, Pa., and Sparrows Point, Md., plants will add 435,000 tons annually. Electrification of the 126 in. plate mill at Phoenix Iron & Steel Co.'s Harrisburg, Pa., works was completed in January. Other steelmakers expect their expansion programs to add another 600,000 tons annually after mid-year 1958. Total plate availability in 1957: 9.1 million tons, about 1.5 million tons greater than the 1956 figure.

Structural shape shipments in 1957 are expected to exceed 1956's by more than 1 million tons. Planned expansions by major producers should bring this total to 6.6 million tons in 1958 and 6.9 million tons by 1959.

Boom—This increased production is largely the result of construction's soaring demand. In 1955, construction used 12.1 million tons of all types of steel. Estimates for 1957 see a 7 per cent rise in heavy construction contracts to a record $23.1 billion. A 5 per cent rise in total new construction to a dollar volume of $46.4 billion is forecast by the Departments of Commerce and Labor. Add to this the $17 billion forecast for maintenance and repair, and the total construction market this year should set a new high of $63.4 billion. Even though part of this dollar-volume increase will be due to inflation, 1957 construction should show a physical gain over the 1956 mark.

As of now, the construction steel picture looks like this:

Shapes—Users are taking all the steel they can get. There is some letup in demand for smaller angles, but requirements for large angles and wide-flange beams hold strong.

A slight easing in structural backlogs is seen. There is a large volume of work on architects' boards, but little new structural work is coming out. Here and there

a cancellation or a deferment is noted.

Plates — Mills are assured far more tonnage than they can handle in the second quarter. Producers and consumers of large plates doubt that a balance between supply and demand will be struck this year.

Light plates are not as difficult to get as they were. A Pittsburgh area user says plates up to ¼-in. are in good supply. The ¼ to ½-in. sizes are improving but are still tight. Extra tonnage will be available in this quarter from strip mills now devoting more rolling time to plates.

Reinforcing Bars—Demand will not press capacity during 1957. Producers estimate the potential rolling capacity to produce reinforcing bars is at least five times the level of 1956 shipments.

Competing with construction for the estimated 15 million tons of plates and shapes available in 1957 will be shipbuilders, railway equipment manufacturers, machinery producers and pipeline fabricators.

Ships—The shipbuilding industry used 760,306 tons of steel from mill sources in 1956. More will be needed in 1957. Currently, 65 commercial vessels costing more than $1 billion are on order. Some 75 per cent of that total booking is for oil tankers, and prospects are that 58 more tankers and two other vessels will soon be ordered.

Rail Equipment — Last year, manufacturers of cars and locomotives used 2,604,447 tons of mill-shipped steel, mostly plates and structurals. Builders expect the shape market to ease; meanwhile, they are using more strip plates. Despite the shortage of steel plates, 7822 freight cars were delivered in January, the highest since October, 1953. Order backlogs stood at 114,656 on Feb. 1 as against 147,320 cars a year ago. Builders are expected to turn out around 85,000 cars this year, compared with 64,000 in 1956.

Machinery—Manufacturers used 264,656 tons of mill-shipped shapes and 1,311,427 tons of plates in 1955. For the first nine months of 1956 the score reads 180,860 net tons of shapes and 1,014,639 net tons of plates. This year, demand should be greater than it was in 1956. Machine tool shipments are expected to hit $900 million plus this year, compared with $886.4 million in 1956. Other types of machinery will do as well or better: Tool and die shipments of $1 billion last year should be equaled in 1957. Industrial gas equipment sales in the next 12 months should match the 1956 total. Construction machinery volume will pass $2 billion in 1957 because of the road program.

Pipe Lines—Industry sources estimate that 1957 should be at least as good as last year. Indication: In 1956, 3,376,000 tons of steel, much of it plate, was used for line pipe.

New England Is Growing

Survey reports region's industry expanding, its economy sound; cites concentration of plastics and electronics plants in area and high capital expenditures

NEW ENGLAND, sometimes thought to be in an industrial decline, has a sturdy economy whose growth promises to continue, reports a New York management consultant firm.

Boni, Watkins, Jason & Co. made a study of the region for the Boston & Maine Railroad to bolster the railroad's ICC application for a $28,874,580 stock exchange plan.

"Far from declining, as is commonly supposed," the consultants report, "New England is healthy and vigorous and is offsetting the decline in textiles and shoes by attracting new industries."

Factor—Cited as good omens for economic expansion: 1. Concentration of plastics and electronics. 2. Increasing capital expenditures. 3. Growing population. 4. Progressive management. 5. Skilled labor. 6. Promotion and development by local groups.

About 15 per cent of the nation's electronics firms are located in New England, and the $500 million plastic industry fabricates a third of the total U.S. output, the report states.

New England electronics industries plan to spend $67 million in the next few years for new plants and equipment which will provide jobs for 8000 additional workers.

Other Signs—Personal income in the region has risen 63.4 per cent since 1946, the report shows; nonagricultural employment is up 5.8 per cent since 1950—the total now is 3,614,000. The consultants term these factors "real signs of continued growth."

The report estimated 1956 capital expenditures of Massachusetts firms alone as 21 per cent higher than "the high 1955 level" and added that some companies plan to spend 40 per cent more in 1957. There will be additional outlays, it continued, by new firms moving into the region.

The Atomic Energy Commission has awarded more than $500 million worth of contracts to New England companies, states the report, but atomic energy research is not limited to government operations. A $33.4 million nuclear power plant will be built at Rowe, Mass., as a joint project of 11 New England power companies.

Diversified—In addition to the atomic powered submarines at the Electric Boat Division of General Dynamics Corp. and Pratt & Whitney Co.'s atomic powered aircraft development, AEC contracts cover all areas of atomic energy study.

The report notes that the region's changing economy has "upgraded the labor force" by causing more employment in durable goods industries (10 per cent higher) than in nondurable goods industries.

Local development organizations (employing 36,000 with an estimated $105 million annual payroll) have brought about construction of 60 new plants with 2.4 million sq ft and helped 425 firms in recent years, the report concludes.

Authenticated News

Anxious to boost its domestic machine tool capacity . . .

India Seeks U.S. Designs

INDIA'S machine tool industry continues to woo U.S. builders. The proposal: To contract for American designs and know-how. Both the American and Indian governments are discreetly cheering the courtship from the sidelines.

The only obstacle to an early wedding: The bride is reluctant. American builders are interested in the idea, but they approach it with misgivings.

Sounding Board—Last week, the Department of Commerce invited 15 machine tool industry spokesmen to Washington. Purpose: Sound out builders' interest in, and reaction to, the Indian proposals.

With few exceptions, industry reaction varied from neutral to negative. The most prevalent block to anything resembling enthusiasm seemed to be the absence of any specific data on which industry could pass judgment.

The Pitch—Now one year into its second five-year plan, India is pulling out all stops in a drive to make itself economically independent. Starting at the base, India's planners put first emphasis on producers' goods.

By 1960, India's steel capacity will have soared 400 per cent over today's level. Imports now account for 80 per cent of the machine tools used in India. Money-short Indians are anxious to reduce these imports. To do it, they plan to boost the country's machine tool production to ten times the 1956 rate in just five years.

Short Cut—To accomplish this growth, Indian builders want to hire achievements of others rather than go through the slow process of evolution. They propose to pay on a royalty basis.

Hitches — U.S. builder resistance is centered on three chief points:

First, no one has come forth with conclusive market data to show a machine tool sales potential in India that would justify extensive participation. Best estimates are based on the five-year plan goals, and these may be watered with optimism. Certainly, based on today's market, a royalty arrangement would most likely be a small share of a tiny pie.

Second, U.S. builders are wary about what will happen after Indians get the know-how. If Indian-built American designs start showing up in U.S. export markets, builders fear they'd have little control—they'd be competing against their own machines.

In reply to a suggestion that they could simply cancel the contract, one builder said it was more likely that you'd simply cancel the royalty. Once the Indian has your know-how and designs, you can't take it away.

Third, several builders are wary about Indian exports to the Communist bloc, particularly Red China. The Commerce department minimizes such concern.

Deciders—One factor may push some builders over the line: The choice probably is to take Indian machine tool business on this basis or lose it altogether.

It's a certainty that India is going to bolster its machine tool industry through contracts with outsiders. If U.S. builders don't join, someone else will. Although Indians generally prefer American machines, they already are negotiating contracts with other countries.

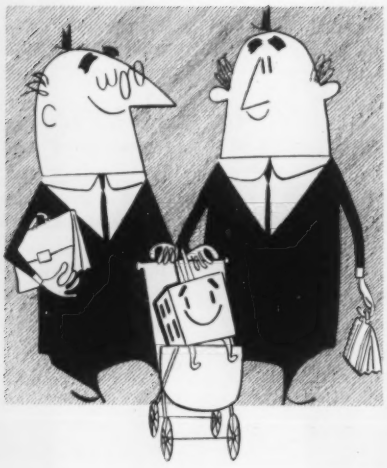
Outcome—The next step undoubtedly will be for the International Co-Operation Administration to send a team to India to study the potential market. U.S. builders at Washington said they'd be willing to help the mission by loaning qualified men to the team.

The outcome of the team's survey will, to a large degree, determine whether U.S. machine tools play a part in India's planned boom.

Canada To Make Steel Wheels

Canadian Steel Foundries Ltd., Montreal, Que., will build a plant to produce wrought steel wheels for railway freight and passenger cars.

The $5-million facility will start operations in 1958 and will make 100,000 wheels a year.



Firms form joint companies because it's often cheaper . . .

Route to Diversification

JOINT COMPANIES are on the increase. Standard & Poor's Corp. lists 160 such companies, most of which are owned on a 50-50 basis by larger firms. Look for that number to grow with the rise in research and development efforts to find raw materials, new metals, new products, new markets.

Most common reasons for such setups: 1. To get into new product lines or markets. 2. To develop new materials or products requiring heavy investment in research or facilities. 3. To exploit natural resources too costly for a single firm to undertake.

New One—Take the case of Olin Revere Metals Corp. Olin Mathieson Chemical Corp. had already announced plans to get into the aluminum business. It proposed an integrated operation producing 60,000 tons annually. Olin expected to invest $120 million ($90 million in the aluminum plant, $30 million for power). Olin would have put up $60 million, obtained $60 million on a loan.

By joining with Revere Copper & Brass Inc., the two will build a 180,000 ton a year plant. Initial financing will cost Olin only about half the original cash outlay.

Says Thomas S. Nichols, president, Olin Mathieson: "The new corporation offers us the advantage of a greatly increased supply of primary aluminum at a significantly lower cost per ton."

Pros—Other advantages of a joint operation: 1. It spreads the risk. 2. Two sources of management and technical know-how can be tapped. 3. Financing is easier when backed by more than one firm. 4. A larger facility can be built, making for economy. 5. It gives some diversification which a company might not be able to afford on its own.

On the minus side are differences in objectives and operating policies, and, sometimes, difficulty in getting quick decisions on major purchases or shifts in operation. (Though most joint ventures are almost independent, parent companies usually reserve the right to pass on major outlays and management decisions.)

Eye to Eye—"Probably the biggest consideration in going into a joint venture," says David Canmann, vice president, Ekco Products, Chicago, "is making sure you can get along and work smoothly with your partner."

For the last three years Ekco has been teamed with Aluminum Co. of America in Ekco-Alcoa Container Corp. Alcoa has aluminum supply and foil know-how. Ekco knows fabrication and has distribution channels to market the aluminum foil containers. In its three years, Ekco-Alcoa sales have increased at least 15 per cent each six months.

Standout—The titanium industry has a notable concentration of jointly owned firms: Cramet Inc. (Crane Co. and Republic Steel Corp.); Mallory-Sharon Titanium Corp. (P. R. Mallory & Co. Inc. and Sharon Steel Corp.); Rem-Cru Titanium Inc. (Remington Arms Co. Inc. and Crucible Steel Co. of America); Titanium Metals Corp. of America (Allegheny Ludlum Steel Corp. and National Lead Co.). A newcomer, Allied-Kennecott Titanium Corp., is owned by Allied Chemical & Dye Corp. and Kennecott Copper Corp.

Similar reasons are found in each formation: Spreading the risk in developing a new material, the complementing of technical and/or market knowledge and the complementing of raw materials and fabricating facilities.

Teamwork — The Allied-Kennecott operation, for example, will use Allied's experience in chemical processing, Kennecott's metal fabricating know-how. Teamed up will be a new continuous process of Allied's Solvay Process Division using sodium to reduce the titanium tetrachloride to titanium sponge and an improved process using titanium slag to make titanium tetrachloride.

Kennecott's subsidiary, Chase Brass & Copper Co. Inc., has processes for melting and fabricating titanium. Expected is further pilot work and market development of an iodide process to produce titanium wih special properties.

Contribution — Companies involved say the job of setting up joint ventures presents about the same problems as the establishment of any new company. In a 50-50 arrangement, financing is equally divided; each parent contributes roughly equal shares of facilities, management and technical people. Many check with the government to see that there will be no objections.

In addition, there are these "musts," says one executive: 1. Each party should clearly outline its conception of the objectives of

the partnership; differences are ironed out early in the game. 2. During formative stages, each parent should handle details such as plant location and the setting up of departments. Agreement is arrived at on each plan before it is put into operation. Feeling is that such an arrangement is more efficient than a co-operative effort on each point.

Proof that joint ownership works: Most companies contacted say they would take on another joint enterprise if circumstances were favorable.

From Freight Cars to Jets

U.S. Industries Inc., New York, acquired Western Design & Mfg. Corp., Goleta, Calif. The west coast firm designs and manufactures supersonic aircraft and missile components and systems. This field is destined to show tremendous growth in the years ahead, both in its military and civilian aspects, says J. I. Snyder Jr., chairman and president of USI.

Robertshaw-Fulton Plant Starts

Bridgeport Thermostat Division, Robertshaw-Fulton Controls Co., Milford, Conn., has opened a $2-million plant which more than doubles the size and output of the installation it replaced.

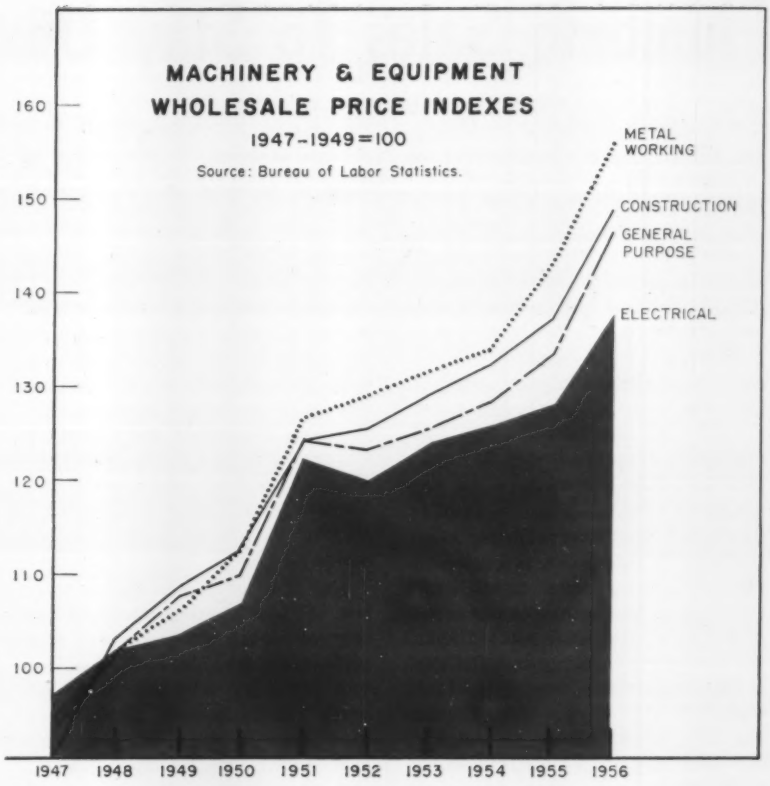
Western Electric Grows

The Hawthorne Works of Western Electric Co., Chicago, will be expanded with a 250,000 sq-ft addition. Construction of the $4-million building will start in the spring and be finished in 18 months to two years.

Admiral Expands TV Plant

A 150,000 sq ft addition to Admiral Corp.'s electronics plant at Harvard, Ill., will be started soon. The plant will be able to produce 6000 television receivers and 1000 high fidelity phonographs a day.

The expansion will nearly complete Admiral's campaign to centralize production, warehousing and shipping of all electronics products in one plant.



Price Increase Coming?

Westinghouse analyzes comparative costs of various types of machinery, labor, metals. Conclusion: "Electrical industry would be justified in further price increases"

ELECTRICAL machinery and equipment price increases are hinted by a Westinghouse Electric Corp. analysis. It compares electrical industry prices with those of construction machinery and equipment, metalworking machinery and general purpose machinery.

Based on data from the Bureau of Labor Statistics, the analysis (see chart) shows that from 1951 on electrical industry prices dropped below the others, with a noticeable spread showing up by 1956.

Slower Rate—The report points out that since 1951 the electrical industry has had a slower rate of increase than any of its three major cost factors: Labor, steel and nonferrous metals, including copper.

Another comparison is made between electrical machinery and equipment prices and a composite index of 50 labor and material items in the generation, construction, transmission and distribution of electricity.

In Line—The report shows that, after 1951, total utility construction costs moved ahead of electrical machinery and equipment costs and have remained higher. Westinghouse products, it adds, are priced close to the industry index.

In summing up, the analysis states: 1. Electrical industry price increases would be justified in view of rising costs. 2. Competitive industries have been forced to raise prices. 3. Price increases of electrical machinery were not a major factor in total utility construction cost hikes since 1951.

Plumbing Sales To Stay Up

Some slack that could result from fewer housing starts can be taken up by more fixtures in new homes, renovation of older dwellings. Long range outlook bright

PLUMBING FIXTURE sales, traditionally bound to housing starts, will not fall off as much as home building this year.

Reasons: 1. Demand for more than one bathroom in moderate priced housing. 2. Increase in number of higher-priced homes with one bath to each bedroom. 3. Renovation of older homes.

Laying Plans—Most manufacturers are too busy mapping sales strategy to pay much attention to rumors or pessimistic predictions. "More than one bathroom per home is becoming the rule rather than the exception," points out Stanley S. Backner, vice president, Universal-Rundle Corp., New Castle, Pa. "There's a substantial demand for houses with a bath for every bedroom."

William E. Kramer, secretary, Plumbing Fixture Manufacturers Association, Washington, reports that the ratio of bathtubs to housing starts rose from 1.6 in 1952 to 1.9 this year. Sales officials of Crane Co., Chicago, add that this trend, as well as an increase in the number of higher-priced homes, should offset some of the decline in new home construction.

Lures—Bathroom fixture manufacturers hold several tempting lures before the home owner to take advantage of the growing consumer desire for improvements. Here's a sample of new design in fixtures offered by Eljer Division, Murray Corp. of America, Detroit: Formed steel baths made with a sloping back; cast iron tubs with a side rim seat.

Use of color is stimulating sales, too. PFMA reports that 70 per cent of young home owners want colored fixtures. In 1953, less than two of every ten tubs were colored. The ratio has jumped to almost four in ten. "You can make your bathroom the most interesting room in the house," promises one manufacturer.

Trend—More than 1.1 million new houses have been started in each of the last five years. Result: Over 80 per cent of manufacturers' sales have been to builders of new homes. Now the sales trend is swinging toward renovation, say officials of the American Radiator & Standard Sanitary Corp., New York. It's estimated major remodeling projects will be carried out in 5 million homes this year.

The renovation market is big. Mr. Kramer reports: "Of 50 million homes in America, 13.5 million have no plumbing; 14 million inadequate plumbing; and 7.5 million have plumbing over 20 years old and now obsolete. The continuing desire for better housing is backed up by rising consumer incomes."

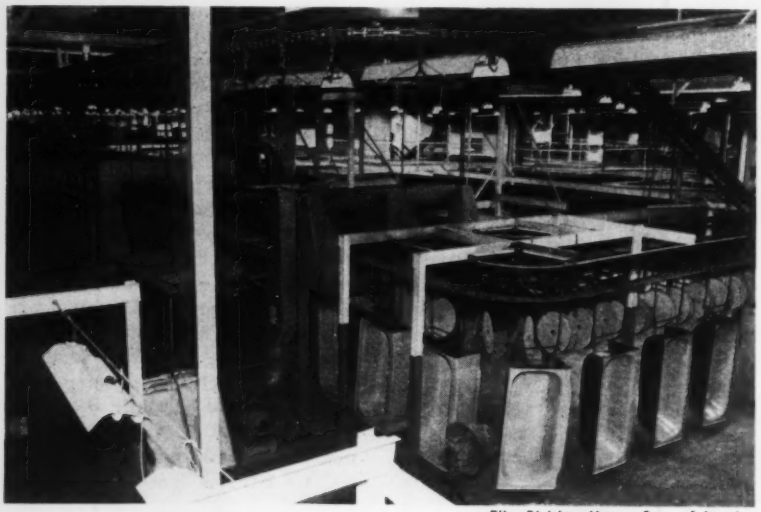
Hard Selling — "According to our calculations, 'tight' mortgage money and fewer housing starts should cut our sales by at least 10 per cent this year," one sales manager says. "But by proving to owners of old homes that their bathrooms 'date' them, we can disprove our own reasoning in 1957."

Trouble Ahead?—Not all manufacturers are so optimistic. They point out estimates of 1957 housing starts (about 1 million) average 10 per cent less than the 1956 figure (1.1 million). Plumbing fixture sales, which reached an estimated $355 million in 1956, could drop to $320 million this year if home construction declines as expected, some say.

Cloudy — Commercial, institutional and industrial building have added momentum to sales of plumbing goods in recent years. But salesmen say the pace is slowing. Mr. Kramer reports: "The dominant note for 1957 among builders of private housing is uncertainty. The average builder finds himself unable to predict his 1957 volume."

A midwestern manufacturer of sinks and lavatory bowls sums up the outlook: "Suppliers will suffer from more than the decline in housing starts. Manufacturers' inventories are 5 to 10 per cent higher than normal. We have heard rumors that plumbing fixture sales will drop as much as 20 per cent this year."

Despite uncertainty in some quarters, 1957 probably won't be too bad a year. And the future looks bright. PFMA cites two trends which bolster the long term outlook for plumbing sales: "The population is becoming increasingly mobile; the size of the average family group is increasing."



Eljer Division, Murray Corp. of America

Finished bathtubs come out of 1560°F U-type furnace

Armco Expands

$50-million program at Ashland, Ky., and Houston will add to ingot and plate capacity

R. L. GRAY, president, Armco Steel Corp., Middletown, O., says Armco's total ingot capacity will be raised to nearly 7 million tons by the middle of 1959.

Construction of the expansion projects will start as soon as the engineering has been completed.

At Ashland—A blast furnace with a 28-ft hearth and a capacity of 50,000 tons of pig iron a month will be built at Ashland. Soaking pits and finishing facilities will be added.

Steel melting facilities will be built with an annual capacity of 750,000 tons of ingots. Part of the ingots will be converted to slabs and shipped by barge on inland waterways to Armco's Sheffield Division plant at Houston.

At Houston—Increased tonnages of wider and larger plates for the southwestern market will be made at Houston. A heating furnace and other additions will be made to the 4-high plate mill there.

Westinghouse Goes South

A multimillion dollar transformer plant will be built in Athens, Ga., by Westinghouse Electric Corp., Pittsburgh.

Production is expected to start about the middle of 1958. When in full production, about 1200 persons will be employed, and the company's capacity for making pole-type distribution transformers will be doubled.

GE Invests $28 Million

General Electric Co., Schenectady, N. Y., will spend 44 per cent more for expansion and modernization in its home town than it did last year.

About $8.5 million will be invested by the Large Steam Turbine-Generator Department. More than 20 new machine tools will be bought—ten of the larger ones have an average cost of over $500,000.

The Gas Turbine Department will spend more than $3 million this year. The Large Motor & Generator Department will invest $4.7 million in its facilities.

Combined investment in the medium and small motor and generator departments will exceed $5 million. Other investments will be made in the foundry department and broadcasting studios.

Expands Titanium Output

Three new furnaces and auxiliary equipment will boost production of titanium dioxide slag at Quebec Iron & Titanium Corp.'s Sorel, Que., processing plant by 60 per cent.

The project will cost over $16 million and is expected to be completed by the beginning of 1959.

Atlas Steel Expands

More than $5 million will be spent for expansion this year by Atlas Steels Ltd., Welland, Ont. The firm will add a second annealing and pickling line and a cold-rolling mill.

Latins Plan Steel Expansion

Steel output in Latin America could double or triple in the next ten years, according to the quarterly review of the Chase Manhattan Bank. Steel capacity in Latin America is now rated at 3.4 million tons (Brazil produces over one-third) while programs under way would lift it to 6.5 million tons by 1960.

This increase is largely due to the entry of Latin republics into the stage of physical development in which metalworking occupies a central role. Argentina presently consumes about 2 million tons annually.

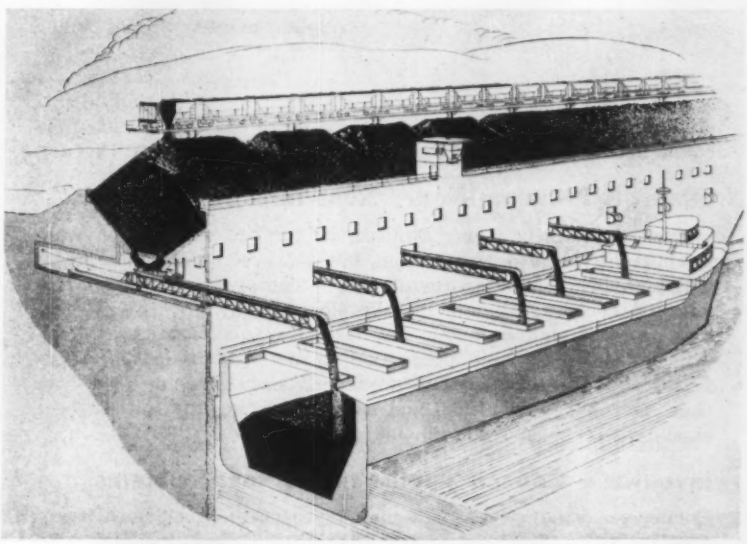
Latin America uses $1.1 billion worth of steel per year. It imported 62 per cent in 1955.

SPS To Spend $7 Million

Standard Pressed Steel Co., Jenkintown, Pa., will spend more than $7 million on new plant and equipment this year.

H. Thomas Hallowell Jr., president, says the expenditures will be for machine tools throughout the company and for new construction in California and at Jenkintown.

A 280,000 sq-ft plant will be built in Santa Ana, Calif., at a cost of $5 million. It will be finished early in 1958. The plant will employ about 500.



Belt Conveyors Will Load Ore Boats with Taconite

This system of 25 shuttle belt conveyors, says Link-Belt Co., Chicago, will be the first of its kind to load Great Lakes ore vessels. The belts will move taconite pellets at Erie Mining Co.'s Taconite Harbor, Minn., port when it begins operation. Each conveyor can load 1500 gross tons of taconite an hour at belt speeds of 500 fpm. Up to ten alternate hatches can be filled simultaneously

Bills on Short Work Week Introduced

SEVERAL rounds in organized labor's fight for the short work week (STEEL, Feb. 18, p. 107) will be battled in Washington. Bills have been introduced in Congress by Sen. Patrick V. McNamara (Dem., Mich.) and Rep. James Roosevelt (Dem., Calif.) that would peg the maximum work week at 35 hours, require overtime pay after that. Expressed aim is to bring about congressional study of the problem rather than immediate action. Extensive study is unlikely this year; committees that would undertake it are tied up with work on extending coverage of the minimum wage. Thinking is that raising the minimum to $1.25 will be the next order of business.

Committee Plans Another Look at Nickel Project

Nickel continues to be under the Washington microscope. Representative Jack Brooks (Dem., Tex.), whose government operations subcommittee has already studied the government's Nicaro, Cuba, nickel project, will take another look at it. Mr. Brooks wants to probe rumors that the General Services Administration is planning to sell the plant before current plant expansion is finished. The original plan was to hold on to the plant until it had run some time at full capacity, which would give both the government and prospective purchasers a better idea of its value. GSA says there is no definite plan for immediate sale. There is also no provision to extend Nickel Processing Corp.'s operating contract beyond its end of June expiration. The Brooks hearings may force a decision.

No Revision of Taft-Hartley Law Seen in 1957

There are indications that another year will go by without revision of the Taft-Hartley Act. Even the building trades which have been pushing hard to be exempted from its effects are reported to have slowed down their efforts. Some quarters say the unions got worried because of the current investigation of labor racketeering, feared attempts to make changes at this time could even result in toughening the labor portions of the act.

Minerals Program Near; Runs Into Controversy

Interior department's long awaited, long range minerals program is apparently nearing completion, but controversy on some points will probably hold it up for a while. The study gets into problems of encouraging minerals development by government tax, fiscal and foreign economic policies. Key question: Are peacetime subsidies to spur production of defense needed materials justified? The sticky points apparently aren't so much whether they are, but what kind and how much government support should there be and who should get it.

Inventor's Council Publishes List of Problems

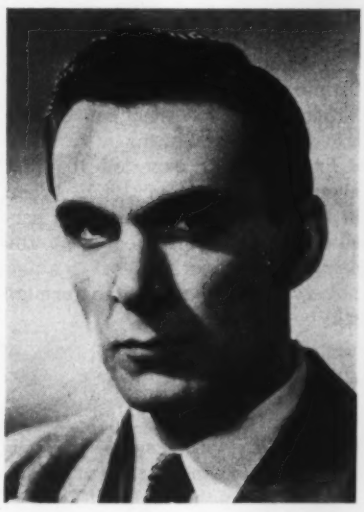
Commerce department's National Inventors Council has issued another "Blue Sky" list—ideas that have defied practical solution so far. Nine that the council says would benefit the nation's defense effort: Nonmagnetic compass, explosive mine detector, method for converting light into electrical energy, snow track eraser, death ray, universal track for use on land vehicles in all types of terrain, quick unloading device for ships, vehicle blackout devices, a new way to send messages which are detectable only by the intended receiver.

Military Standardizes

The military is putting into effect standardized buying policies and techniques for price negotiation. Wanted are more specific guide lines for defense buyers to size up cost, price and profit relationships, factors influencing the amount of profit allowed.

Exports to Curtain Low

U.S. exports behind the Iron Curtain are running well below the value of goods licensed. Commerce Secretary Sinclair Weeks reports that in the last 12 months only $10 million in goods was exported, though licenses amounted to $24.3 million. Metalworking is still a big factor in the trade, but levels are well below those of ten years ago. In 1947, industrial machinery exports to Eastern Europe hit $105 million; in nine months of 1956 exports were $830,000. Electrical machinery shipments slid from $26 million to $134,000.



Meet S. G. Falk: He's chief, Castings Branch, Iron & Steel Division, Business & Defense Services Administration. Mr. Falk is on leave for six months from duties as manager of marketing research, Falk Corp., Milwaukee. In Washington he can be reached at Sterling 3-9200, extension 2279.

Morgoil Bearings in Action

The 18″-72 MORGOILS on the 9″ and 21″ x 44″ Aluminum Foil Mill at Cochran Foil Co. pictured above make it easier to produce a quality product at high speed. Foil as thin as .00025 of an inch is rolled at speeds approaching 4000 feet per minute on MORGOIL-equipped mills. MORGOIL BEARINGS give you freedom from wear and fatigue and permit operation at high speeds with remarkable long bearing life.

MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS
WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL

MB-31

MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER MORGAN WORCESTER

This Whiting Crane at Continental quickly carries heavy coils of wire from storage to production—keeping machines busy without jam-up.

How Continental Steel's "special" cranes pay off!

Continental Steel Corporation, Kokomo, Indiana, depends on three "special" Whiting Cranes to keep production flowing fast. Two of them are 5-ton overhead cranes used to spot coils of wire accurately at automatic wire welding machines, then move the finished reinforcing fabric to shipping or storage. The third Whiting Crane is a low profile gantry with floor level hoisting drive. It moves all production in Continental's pickling department and has played an important part in increasing the company's wire production by nearly 50%. These cranes – like all Whiting Cranes – are "special" because each is custom engineered to do a specific job, day in and day out, with a minimum of maintenance.

WHITING CORPORATION, 15643 Lathrop Avenue, Harvey, Illinois

SEND FOR THIS REPORT!
An illustrated 6-page case study, "Custom Built Whiting Cranes for Continental Steel Corporation" tells how these cranes were engineered to solve special problems. Write for a copy today.

MANUFACTURERS OF CRANES, TRAMBEAM HANDLING SYSTEMS, TRACKMOBILES, FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

Case's class of '41: Fifteen years brings a few changes

(Percentage of respondents)

	FIELD					
	Civil	Mechanical	Electrical	Metallurgy	Physics	Chemistry
Still working in major field	67	78	67	58	50	67
Type position:						
Production	25	22	17	26	0	13
Sales	25	26	11	29	0	21
Research	8	18	33	19	25	29
Education	8	0	0	3	50	4
Administration	33	34	39	23	25	33
Self-employed	8	18	0	19	0	12
Job changes (median number)	4	2	2	1	1.5	1
Annual income (median)	$10,000	$12,400	$11,000	$10,750	$11,350	$11,500

Source: Survey by Dr. Lynn J. Ebert, executive officer, Metallurgical Department, Case Institute of Technology, Cleveland, and Willard Pugh Jr., Cleveland Electric Illuminating Co., Painesville, O.

Where Are They Now?

Few Case graduates leave the engineering field, but nearly one-third change their type of engineering, and 45 per cent concentrate on nontechnical aspects of their specialty

ADVICE to this year's engineering school graduate: Fifteen years from now you may be making more money if you're a mechanical engineer, but if your waistline is of major concern, you ought to consider civil engineering. (Their weight increase from 1941 to 1956 averages 5.7 lb less than that of other graduates.)

Those are two of the facts turned up in a survey of Case Institute of Technology's (Cleveland) class of '41 (see table).

Changing Fields—Another point: You don't need to confine future activities to your graduating field. Case's study shows 32 per cent shifted their engineering interests after graduation. Mechanical engineers were the least inclined to shift. They are also the best paid.

Dr. Lynn J. Ebert, executive officer of Case's metallurgical department, notes that most field changes occur within five or six years after graduation. That also applies to job changes from company to company.

Changing Jobs — The average Case graduate of 1941 changed jobs 1.9 times in 15 years. But some enterprising engineers have had as many as seven jobs in that time. Civil engineers seem to do the most moving (a median of four changes).

Dr. Ebert reports "relatively few" of the class of '41 have left engineering entirely. That conclusion is based on replies from 139 of the 194 graduates. He has heard of one who become an insurance salesman.

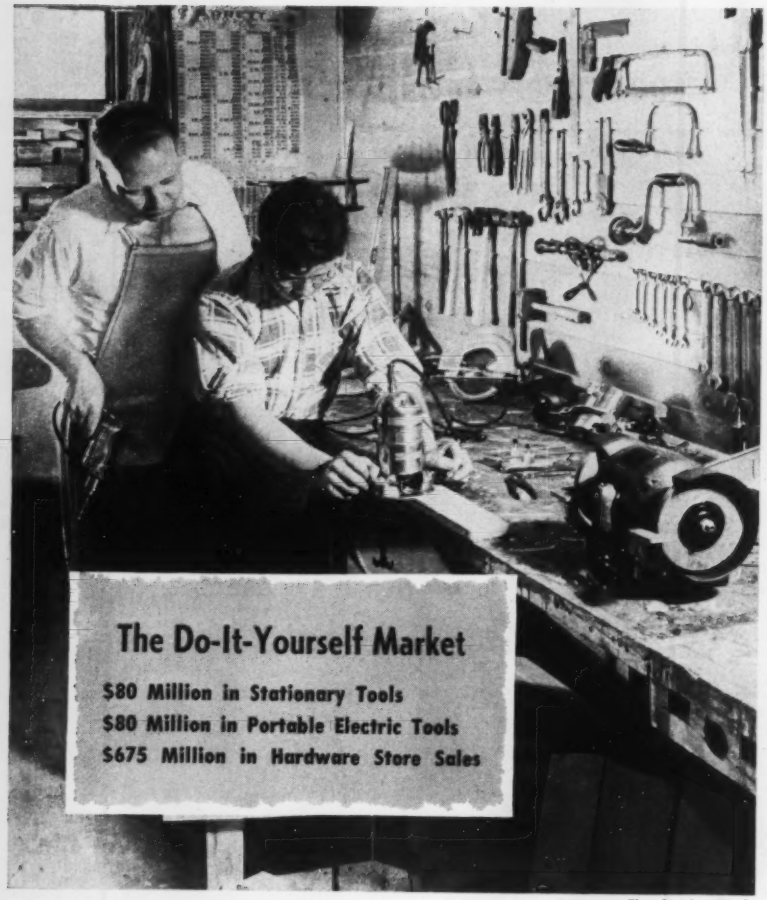
Many have stopped doing technical work (45 per cent). They've moved on to administrative and sales duties, among others.

Miscellany—Metallurgical graduates gained more advanced degrees than any other group; civil engineers earned more professional engineering licenses.

More metallurgical engineers are self-employed; more electrical engineers are doing administrative duties; more metallurgical engineers are in sales positions.

Civil engineers average one more child than mechanical engineers; electrical engineers fall 10 percentage points below the average for home ownership.

Conclusion — Case's engineers seem to be doing pretty well financially although the lower than average pay for civil engineers points up the need for more of them to meet the vital public construction projects under way or on drawing boards. It has been noted by other sources that the billion-dollar highway program will eventually take many more engineers than are immediately available. The President's new school program will make similar demands on engineering talent.


The Do-It-Yourself Market
$80 Million in Stationary Tools
$80 Million in Portable Electric Tools
$675 Million in Hardware Store Sales

The Stanley Works

Do It Yourself: New Trends?

Days of the easy sell are over. Sales gains are going to those companies alert to a changing demand pattern: Repair work gains at expense of botch-it-yourself projects

GUS FIXIT is causing some furrowed brows among makers of do-it-yourself equipment. Reason: Gus discovered he has five thumbs on each hand and has decided to spend more time watching TV fights and less in his basement workshop.

Despite the Guses, the do-it-yourself trend rolls on. Most companies find business good; many say it will be better than ever this year. But changing interests of the do it yourselfer have hurt.

Example — One maker of drill presses, routers and sanders for home craftsmen says: "Our business is down about 7 or 8 per cent from last year's. It's more than 50 per cent off from what it was five or six years ago."

He says the homeowner who is forced to do his own plumbing, painting and electrical work because of the high cost of labor represents biggest market today. He continues: "These people don't want quality lathes and drill presses. They use portable hand tools."

The changing character of the market has been noted by the do-it-yourself shows. There is more emphasis on creative activities—boating, outdoor cooking, pottery and ceramic work.

Art castings are emphasized in the advertising of Kansas City Specialties Co., Marysville, Kans. It sees a continued increase in sales of its foundry kits. The trend, it says, started several years ago with the do-it-yourself clubs.

Market—The estimated $10 billion to $15 billion market has many facets, including paint, lumber, tools, assembly kits, dressmaking, and plumbing, heating and electrical projects.

Metalworking's share is limited largely to tools and hardware.

The National Retail Hardware Association, Indianapolis, estimates that about 40 per cent of the business of its 22,500 member stores is done with the do it yourselfer. In dollars, this represents about $400 million a year for builder's hardware, fasteners and plumbing and electrical goods. Hand and power tools make up another $100 million of their sales. Paint is another big item.

More Figures—Estimates of tool sales to the home craftsman are complicated by the fact that many of these items are purchased by garages, service shops and tradesmen. Some home craftsmen also buy tools intended for industry.

Sales of portable electric tools to this market are estimated at $70 million to $80 million a year by Black & Decker Mfg. Co., Towson, Md.

Magna Power Tool Corp., Menlo Park, Calif., estimates retail sales of stationary woodworking tools to home craftsmen in 1956 at about $60 million. DeWalt Inc., Lancaster, Pa., thinks they may be closer to $100 million.

Steel measuring tapes; hand and special purpose saws; circular, hack and band saw blades; files; and garden tools for do-it-yourself fans are made by Henry Disston Division, H. K. Porter Company Inc., Philadelphia. It calls this market a growing one—estimates it at about $40 million.

Metalworking machine tools for

the handyman are in a slump. The Bureau of Census says $9.3 million worth (at factory selling prices) were produced for home workshops, garages and service shops in 1954. This was less than a third of the volume in 1947. Richard D. Huff, assistant vice president, South Bend Lathe Works Corp., South Bend, Ind., believes that many who buy machine tools are more interested in establishing a small, part time business than in doing odd jobs around the house.

Other Markets—Baden Steelbar Co., Baden, Pa., sells short lengths of threaded bars, rounds, angles and flats through hardware and builder's supply stores. In six years, 8500 retail stores have adopted Baden's method of selling steel. (It's similar to the do-it-yourself aluminum sales method.)

Another metal product with growing sales is made by Cross Engineering Co., Carbondale, Pa. The product: Perforated steel sheets that can be cut with tin snips.

Home craftsmen are buying an increasing number of hand tools. The Stanley Works, New Britain, Conn., says handymen buy 65 per cent of the hand tools sold; artisans buy the rest. Before World War II the percentages were reversed.

Stanley has developed a merchandising system which has boosted sales and turnover of hardware dealers more than 100 per cent. Dealers concentrate on best sellers. The company has found that 600 tools (about 25 per cent of the line) will produce 80 per cent of the hand tool sales in a typical store.

How To Sell — There seem to be almost as many ways to sell to the home craftsman as there are companies with something to sell. Most use the services of distributors or wholesalers.

DeWalt entered the field in 1953 with a versatile sawing unit which is a duplicate of what it sells to industrial and commercial users except for size, power and capacity. The company's total sales are about 400 per cent higher than they were in 1952; about 70 per cent of the new business is attributed to the home craftsman. DeWalt expects the upward trend to continue beyond this year.

DeWalt establishes franchises directly with its retailers. It has a network of district representatives to sell and service these accounts.

Other Ways—Magna Power Tool started in 1947 with a multipurpose woodworking tool (the Shopsmith) which is designed for the do it yourselfer. It also has a growing line of single purpose tools. The Shopsmith is sold by independent franchised dealers and a large chain store organization.

Magna has increased its sales every year since its founding. But it believes its recent gains are due more to its strong competitive position than to a growing market.

Power Tools Inc., Beloit, Wis., sells its Supershop exclusively to home craftsmen directly from the factory by mail order methods.

Vincent H. Lauer, vice president, says: "We anticipate a continuing gradual upward trend in sales—roughly proportional to the population growth."

A combination of methods is used by the Henry Disston Division. It uses the channels of hardware distribution, with hardware and building supply dealers as the end outlet. It goes out after the consumer with advertising in craftsmen's magazines.

What Users Want — Home craftsmen want quality but are sometimes reluctant to pay for it. American Machine & Tool Co. Inc., Royersford, Pa., finds buyers want "quality machinery with a tolerance to 1000th of an inch." It says purchasers know exactly what they are buying, but "it is surprising how sales fall off when the price of an improved saw is increased from $29.95 to $34.50."

Popular Science says home craftsmen "do not ordinarily demand the same exacting standards in the products they purchase for use in their home workshops as their industrial counterparts."

The most popular tool, says *Mechanix Illustrated,* is the portable electric drill. One reason for its brisk sales (they're predicted to improve this year) is a large number of attachments and accessories. They make it possible to saw, sand, grind, buff, hone, mix paint, drive screws and trim hedges.

Trend—F. P. Maxwell, vice president, Delta Power Tool Division, Rockwell Mfg. Co., Pittsburgh, says the home workshop is beginning to take on a semi-industrial look because the do it yourselfer has gained some tool know-how and is demanding bigger capacity equipment.

He continues: "What we're confronted with is the coming of age, the midsummer bloom, of the do-it-yourself trend. Home workshop tools for increasing numbers of advanced home craftsmen must have the look and feel and much of the capacity of their counterparts in industry."

Magna Power Tool uses Electricweld tubing from Jones & Laughlin Steel Corp.

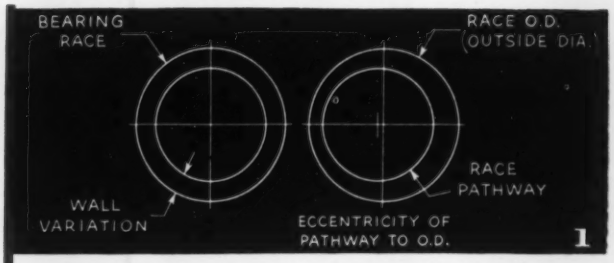
ONE OF A SERIES . . .

What makes a Hyatt roller bearing good?

CLOSE CONTROL OF INTERNAL DIMENSIONS and CLEARANCES

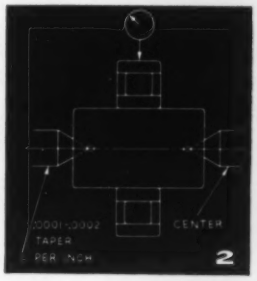
The running accuracy and smoothness of a HYATT roller bearing is governed by the tolerances of its internal dimensions and its internal clearance. Internal dimensions include concentricity of race diameters, uniformity of roller diameters and squareness of all radial and axial surfaces.

Because the internal dimensions of HYATT Hy-Roll bearings are so closely controlled, HYATTS run smoothly and quietly, last longer, and prevent equipment trouble due to excessive heat and vibration. You will find full selection and application data in HYATT General Catalog 150, or call your nearest HYATT Sales Engineer. HYATT Bearings Division, General Motors Corporation, Harrison, New Jersey. Sales offices at Harrison, New Jersey; Pittsburgh, Pennsylvania; Detroit, Michigan; Chicago, Illinois; and Oakland, California.



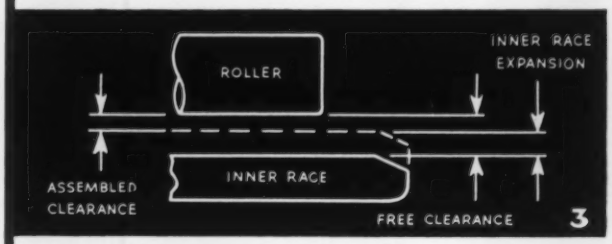
CONCENTRICITY OF RACE DIAMETERS

Concentricity of race diameters is usually defined in terms of wall variation, Figure 1, of the individual races, and radial run-out of the assembled bearing. The latter is generally a user's inspection where the bearing is mounted on an arbor, Figure 2, having a slight taper (.0001" to .0002" on the diameter per inch of length) and the radial run-out indicated as shown by turning either the arbor or the outer race one revolution while the other member is held stationary and noting the difference between the minimum and maximum readings. Industry standards are available which indicate what values are acceptable.



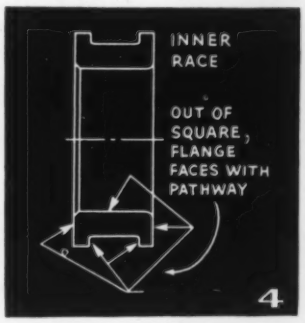
UNIFORMITY OF ROLLER DIAMETERS

Roller diameter uniformity, which is also necessary to running smoothness, is obtained by segregating the rollers into diameter variation classes of .00005", .0001" or .00015", depending on bearing size and quality grade and assembling only rollers of the same class into a given bearing. Rollers are then matched with races which are segregated in a similar manner in order to control the diameter over or under the rollers, which governs the internal clearance spread of the mounted bearing. Figure 3 (magnified)



SQUARENESS OF RACE AND ROLLER ENDS AND FLANGE FACES

Figure 4 indicates the race surfaces which must be square with each other within minute tolerances depending on the grade of the bearing. This is to prevent roller skewing with consequent heating and noisy operation. The roller ends must also be square with the diameter for the same reason. End square tolerances are usually less than .001" for the most frequently used sizes.

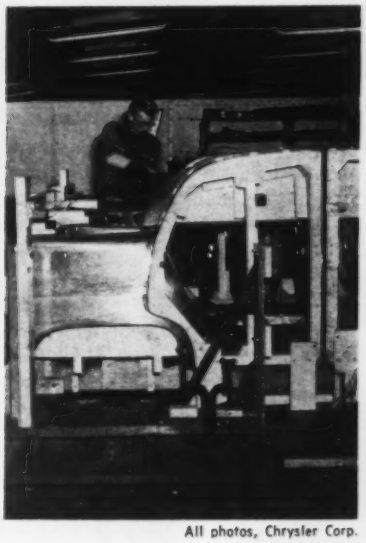


GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS FOR MODERN INDUSTRY

Plastic templates for prototype checks

Hammer blocks for short runs



Wooden fixtures for prototype

All photos, Chrysler Corp.

Detroit Eyes Tooling Costs

Watch for a big campaign to trim back indirect and hidden expenses. Auto makers are also giving automation another look because of the high charges for its tooling

AUTO MAKERS are starting another push to cut tooling costs.

Last year, the industry spent $900 million to tool its 1957 cars.

This year, it's estimated tooling costs will be a third less because of fewer model changes and because tool engineers are under pressure to prune costs.

Down the Spout—John F. Anderson, manager of production engineering for Chrysler's engine division, asserts: "The industry always has worried about keeping direct labor costs in line. Now it's beginning to look like indirect labor and burden costs are the places where pennies are fizzled away."

Mr. Anderson should know. The engine division is less than a year old, but it has the highest performance rating of any Chrysler division.

The division is using a tool life analysis system similar to the one initiated by Pontiac (see STEEL, Oct. 1, 1956, p. 127). "With this tabulating system, we can spot tools which are consistently bad; can redesign tools, change fixtures and even make minor changes on parts to save tooling dollars," says Mr. Anderson.

Eagle Eye — But when such changes come before the division's three-man committee, which hashes out ways and means of bringing equipment up to production standards, indirect and hidden costs get the closest scrutiny.

Several proposals are studied. Even though production results may be the same, indirect burdens can make one method a bugaboo costwise.

The product engineer points out what changes are needed. Production engineering figures out different ways of doing it. The comptroller adds up the cost of doing it each way.

Example — Take crankshafts. Chrysler has been machining its forged cranks in one or two operations on complicated and costly equipment. The committee stepped in and researched the job.

Now Chrysler plans to use carbide tipped cutting tools operating at 600 sfpm. The crankshafts will be suspended on centers; two counterbalances are held in chucks, and each bearing surface will be turned down separately.

One source estimates this method will save Chrysler 15 to 20 cents on each crankshaft.

Hypnotized—Automation may be contributing to higher tooling costs in some cases. Suggests Mr. Anderson: "Engineers sometimes get so entranced in figuring out how to automate a job, they forget it can be made more cheaply with less automation."

It's understood that Chrysler's Trenton, Mich., engine plant (soon to be in operation) will be less automated than its Mound Road

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facility which has been hailed as the most completely automated engine plant in the business.

Tooling for bearing cap production costs $500,000 at the Mound Road plant, but in the Trenton layout, tooling for this product will be less than half that amount even though the cap is almost identical.

Shooting Gallery—Vendors are included in the cost reduction program. "In many cases, the vendor's indirect manufacturing costs are boosting his price," claims Mr. Anderson.

The division figures a target price for its purchasing agents, then throws out the challenge: "We can make it for this price. Why can't you buy it for this one?"

The target price on one part, for example, was 7 cents. The vendor was charging 16 cents. Closer attention to his indirect costs (at Chrysler's suggestion), knocked the vendor's price down to specified levels with no changes in specifications or materials.

Short Runs — In another area, tooling for low volume and prototype production points out common cost cutting methods that can be applied to many jobs.

Frederic S. Altman, supervisor of tool design for GM's Fisher Body Division, told members of the Detroit chapter of the Society of Automotive Engineers that Fisher Body uses mostly kirksite hammer forms for low volume output.

Hammer forms of wood or kirksite are used for hand forming parts. They replace costly steel dies used in high volume runs. Mr. Altman points out that kirksite is good because it can be quickly cast and reclaimed after use.

Plastics — "Laminated plastic marking templates are used to establish trim lines and hole locations. Sometimes, drill bushings are added to them so they can be used for drill jigs as well.

"Small flat body parts are trimmed with hand tools, power saws or stamped out with cookie cutter blanking dies made of plywood, thin steel die stock and rubber."

Inexpensive plastic and wooden checking gages and fixtures are used for prototype build-ups and for some low volume production runs, he adds.

Future—Mr. Altman sees plastics as one of the most versatile of all tooling materials, but he believes "the investment casting process bears watching."

He also says: "Powder metallurgy, chemical milling, electrical erosion and metal bonding with special adhesives or plastics are new processes which soon may leave their mark on tool construction."

Driving the Golden Hawk

We've been driving Studebaker's Golden Hawk, concentrating mostly on its nonslip differential. (It transfers driving power to the rear wheel which has the most rather than the least traction.)

On one test, we drove the Hawk into a mud hole. The right rear wheel was in up to the axle, and the left rear and both front wheels rested on pavement. We had no difficulty in getting out.

We didn't tune it up. Our tests, under normal driving conditions, are similar to ones any car owner might want to try. Here are the results:

- Average top speed over three trials on a straightaway: 109 mph.
- Highest top speed: 114 mph.
- Highway gas consumption on runs of 300 and 200 miles (65 mph): 14.5 mpg.
- In-town gas consumption for 530 miles: 12.7 mpg.
- Average of six acceleration tests on dry pavement (0-60 mph): 12.8 seconds (includes automatic transmission shift).
- Average of six acceleration tests on dry pavement (0-30 mph): 4.5 seconds.

Fade — The Hawk has finned brake drums. In checking brake fade on the straightaway, we made a series of 13 quick stops before the brakes faded to a danger point.

In a similar test on another '57 car with about the same weight and the same size drake drum, we made only six stops before the brake pedal hit the floor.

Swing and Sway—Cornering was excellent on flat curves at speeds up to 55 mph. Above that, the Hawk starts to skid. Between 34 and 45 mph, there is an average amount of side sway, but surprisingly little dip.

Its low center of gravity (height is 55.1 in.) over a 120.5-in. wheelbase makes for smooth cornering on banked curves at speeds up to 90 mph.

Summary — We felt the Hawk has excellent road handling characteristics. It's transmission is smooth and brakes hold well. Performance should improve with careful tuning.

The Hawk is the only four-seated sport type built in this country. (Ford plans to bring out a four-seater T-Bird).

U.S. Auto Output

Passenger Only

	1957	1956
January	642,090	612,078
February		555,596
March		575,260
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Jan. 26	145,191	135,586
Feb. 2	140,411	140,582
Feb. 9	147,163	136,308
Feb. 16	145,846	128,320
Feb. 23	139,497†	125,537
Mar. 2	144,000*	132,889

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Auto Steel Stocks Low

April orders for cold-rolled sheets from auto makers are in. Mills report no sizable increases. Car builders' inventories are below old norms (30-day average).

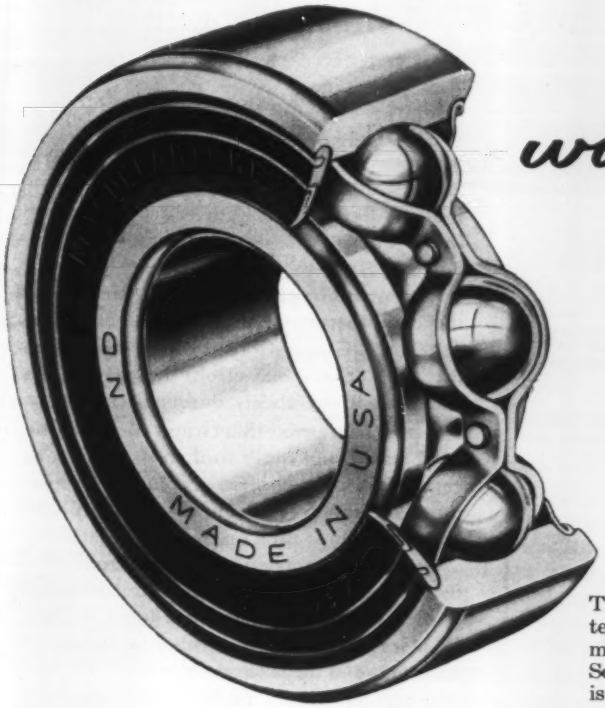
Says one Detroit mill: "April orders still are weak, although our cold mill is filled to capacity. We do have a few weak spots in our hot mills. Stainless orders in the 400 series also are weak."

Purchasing agents are sweating out what will happen if the spring market booms, but top management among the auto makers apparently is holding firm.

FACTS

about

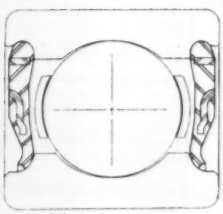
NEW DEPARTURE BALL BEARINGS



with

SENTRI-SEAL

on guard against dirt and wear!



The diagram shows in section the New Department Sentri-Seal. Lip-contacting surfaces are form-ground simultaneously with the ball race, giving an extremely high degree of concentricity between sealing surfaces and the raceway.

The unique design of the Sentri-Seal gives optimum protection against dirt, and includes a number of other major advantages.

Sentri-Seals can be removed, easily replaced. As the seal is of synthetic rubber in which two metal rings are embedded, a constant-rate spring is created between the rings. Inherent flexibility prevents distortion of the bearing outer ring due to seal insertion, permitting the use of bearings to the higher accuracy specifications. The spring action maintains an efficient sealing contact with the bearing ring to bar dirt and retain lubricant. Sentri-Seals are relatively inert to oils and greases and operate satisfactorily through a temperature range of −40°F. to 225°F. Specifications available for still higher temperatures. In applications where relubrication is desired, it is easily accomplished by the injection method.

SEE "WIDE WIDE WORLD" SUNDAYS—NBC-TV

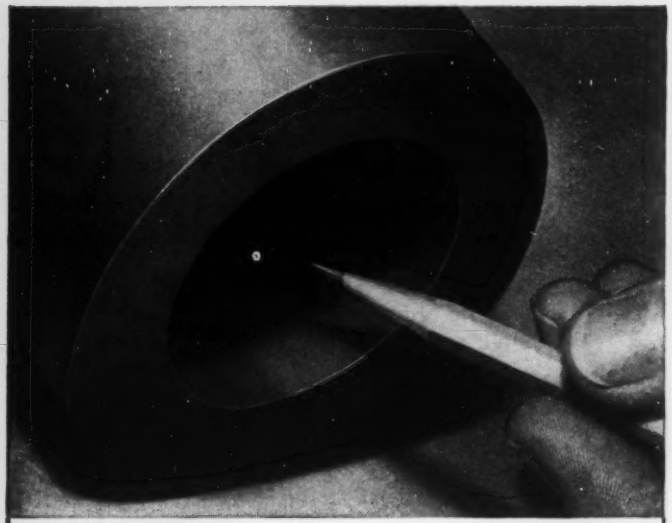
Sentri-Seal is available for a range of sizes in single-row, standard-width bearings and also in two types of New Departure adapter bearings. Sizes, dimensions and capacities are listed in the latest New Departure catalog.

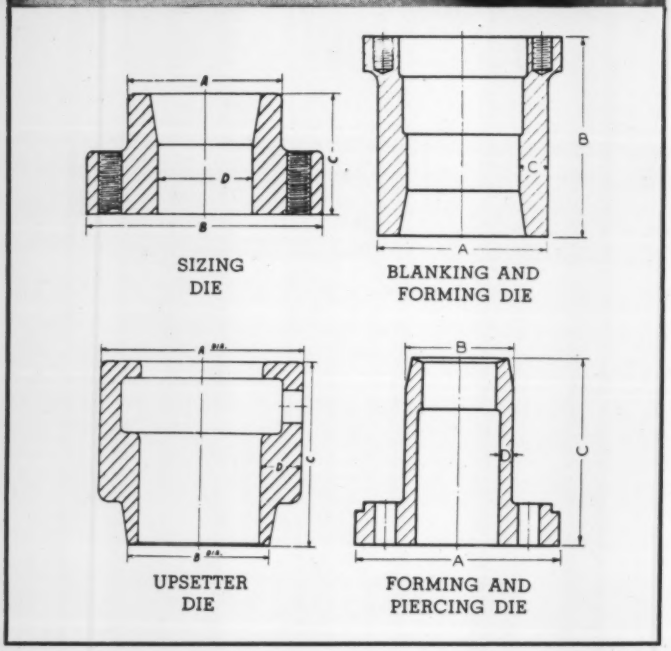
Write for full details on Sentri-Seal

BALL BEARINGS MAKE GOOD PRODUCTS BETTER

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

SPEED PRODUCTION, CUT WASTE WHEN MAKING RING-SHAPED TOOL STEEL PARTS





New Graph-Mo® Hollow-Bar eliminates drilling, machines 30% faster

IF you make ring-shaped tool steel parts, you'll find that you can speed production, cut waste, and save steel by using Graph-Mo® Hollow-Bar. That's because Graph-Mo Hollow-Bar comes with the hole already in it. There's no drilling. You start with finish boring.

And with Graph-Mo Hollow-Bar you get the combination of proved advantages that have made Graph-Mo one of the most popular tool steels: excellent machinability, exceptional wearability, unsurpassed stability.

Actual tests prove that Graph-Mo machines 30% faster than other tool steels. That's because Graph-Mo has free graphite in its structure. And this free graphite gives Graph-Mo less tendency to pick up, scuff, and gall.

Graph-Mo's amazing wear resistance stems from a combination of graphite and diamond-hard carbides. Reports from users indicate that Graph-Mo outwears other tool steels on an average of three to one.

Graph-Mo also is the most stable tool steel ever made. A master plug gage made from this steel showed less than ten millionths of an inch dimensional change after 12 years in use. And Graph-Mo responds uniformly to heat treatment, too.

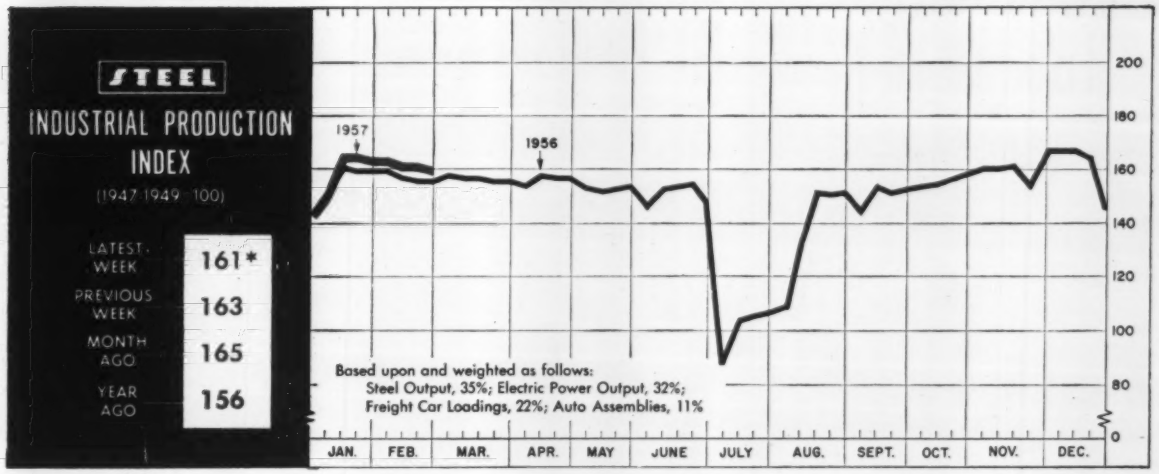
Makers of ring-shaped tool steel parts may obtain Graph-Mo Hollow-Bar in sizes from 4 to 16 inches O.D. with various wall thicknesses.

To learn more about Graph-Mo Hollow-Bar, and its application to your problems, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended Feb. 23.

Activity Rides Above Last Year's Level

ONE-SIXTH of 1957 is past. During both months, STEEL's industrial production index rode above the line for the comparable period of last year (see chart above). Yet this was the time that prophets of gloom were peddling their wares.

The Federal Reserve Board's industrial production index (see page 72) also is riding above year-ago levels, the January report being the latest one available.

What's Normal? — So many people have become accustomed to a continuous sharp incline in business activities that they think it is normal. People whose working lives began in 1940 have never experienced a serious recession except for brief spells in 1949 and 1954.

Brakes—The two main factors in lowering the rate of climb of business activity are the absence of urgency to build protective inventories and the Federal Reserve Board's restrictions on credit. The need to keep inventories high ended with the assurance of comparative labor peace—an outstanding example is the three-year labor contract in the steel industry.

Purchasing agents — they're quick to react to trends of business—display considerable confidence. To determine future sales expectations and production plans, the National Association of Purchasing Agents, New York, asked its members to indicate whether the hours worked by employees in their companies would increase, remain constant or decrease in the next few months. Sixty-five per cent of the respondents say the hours worked will be as high as they were in 1956, 26 per cent think the hours will be reduced and 9 per cent expect an increase.

No Loafing—If the hours worked equal the 1956 pace, people will be busy. Throughout last year, manufacturing industries worked an average of at least 2.6 hours overtime a week. At the end of 1956, overtime hit a high for the year —3.2 hours a week.

The purchasing agents report

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,456[1]	2,504	2,459
Electric Power Distributed (million kw-hr)	11,800[1]	11,946	11,277
Bituminous Coal Output (1000 tons)	9,745[1]	9,725	10,050
Petroleum Production (daily avg—1000 bbl)	7,500[1]	7,515	7,183
Construction Volume (*ENR*—millions)	$374.7	$311.6	$440.1
Auto, Truck Output, U. S., Canada (*Ward's*)	169,531	179,835	156,293
TRADE			
Freight Car Loadings (1000 cars)	670[1]	676	687
Business Failures (Dun & Bradstreet)	317	287	252
Currency in Circulation (millions)[3]	$30,605	$30,641	$30,210
Dept. Store Sales (changes from year ago)[3]	+7%	+4%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,663	$18,575	$18,595
Federal Gross Debt (billions)	$275.7	$275.9	$279.7
Bond Volume, NYSE (millions)	$13.5	$23.7	$17.5
Stocks Sales, NYSE (thousands of shares)	6,964	11,942	10,568
Loans and Investments (billions)[4]	$84.8	$85.1	$84.3
U. S. Govt. Obligations Held (billions)[4]	$25.7	$25.9	$28.5
PRICES			
STEEL's Finished Steel Price Index[5]	227.10	227.10	209.10
STEEL's Nonferrous Metal Price Index[6]	239.3	240.6	279.4
All Commodities[7]	117.1[1]	117.0	112.0
Commodities Other Than Farm & Foods[7]	125.5[1]	125.4	120.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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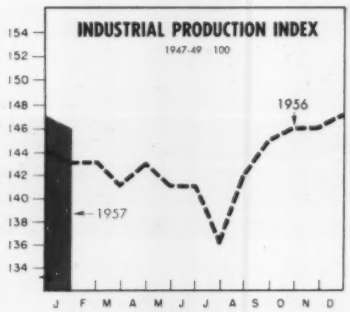
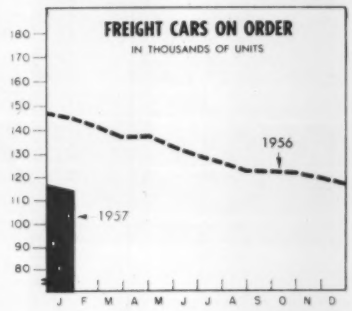
THE BUSINESS TREND





(Seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1957	1956	1957	1956	1957	1956
Jan.	146*	143	143	148	180	170
Feb.	...	143	...	148	...	168
Mar.	...	141	...	145	...	166
Apr.	...	143	...	146	...	171
May	...	141	...	141	...	167
June	...	141	...	138	...	168
July	...	136	...	68	...	169
Aug.	...	142	...	124	...	172
Sept.	...	145	...	148	...	176
Oct.	...	146	...	147	...	177
Nov.	...	146	...	147	...	180
Dec.	...	147	...	149	...	181
Avg.	...	143	...	137	...	172

Federal Reserve Board. *Preliminary.

Charts copyright, 1957, STEEL.

	Awards		Backlog (end of month)	
	1957	1956	1957	1956
Jan.	5,328	1,818	114,656	144,946
Feb.	....	1,675	.....	141,437
Mar.	....	1,618	.....	137,070
Apr.	....	6,559	.....	137,436
May	....	2,403	.....	133,072
June	....	2,859	.....	129,409
July	....	2,642	.....	126,194
Aug.	....	2,575	.....	122,870
Sept.	....	3,949	.....	122,421
Oct.	....	6,532	.....	122,250
Nov.	....	4,172	.....	119,626
Dec.	....	4,992	.....	117,320
Totals	....	41,794		

that production remains high. Twenty-seven per cent of the respondents say it is above the January level; 55 per cent say it is the same; and 18 per cent report it is worse.

Good Going—New orders are being booked in satisfactory volume. Twenty-seven per cent of the respondents report an increase over the January pace; 50 per cent see no change; and 23 per cent say there is a decrease.

Purchasing agents are exercising caution in their buying policies. Many believe most materials will be in abundant supply this year. They foresee competition developing in areas where it has been absent for some time.

Basic Indicators High

A St. Louis purchasing agent commented that some people are moaning about business conditions, but when you ask them how their own company's business is, they reply: "It's good."

Good business is reflected by three basic indicators—automobile assemblies, steel ingot production and electric power generation. All three are ahead of year-ago levels. Passenger auto output this year is 7 per cent ahead of last year's. Steel ingot output so far this year is equal to last year's, and the production of electricity is running around 6 per cent ahead of the 1956 pace.

Bright Promises

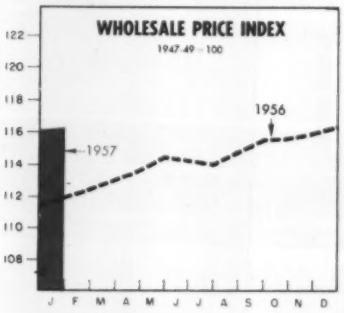
Promise of continued good business is seen in new orders placed in January for machine tools. New orders, minus cancellations, totaled $63 million, the National Machine Tool Builders' Association reports.

While the January, 1957, volume is lower than the January, 1956, total of $109,550,000, it is above December's $57.2 million (the lowest mark of the year).

In contrast, shipments in January, 1957, valued at $76.6 million, exceeded the $54.6 million of January, 1956, but fell below December's $85,150,000. The January, 1957, shipments—at $76.6 million—exceeded the 1956 monthly average of $73,850,000.

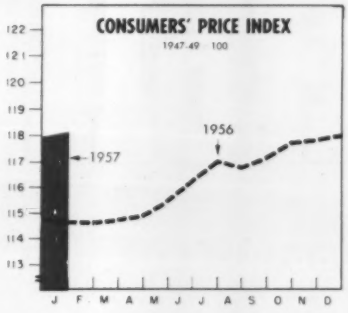
The machine tool industry's order backlog is estimated at 6.1 months of production.

Another bright sign is the backlog of orders for industrial furnaces. It is a record high for



	All Commodities		Other Than Farm & Foods	
	1957	1956	1957	1956
Jan.	116.9	111.9	125.2	120.4
Feb.	....	112.4	....	120.6
Mar.	....	112.8	....	121.0
Apr.	....	113.6	....	121.6
May	....	114.4	....	121.7
June	....	114.2	....	121.5
July	....	114.0	....	121.4
Aug.	....	114.7	....	122.5
Sept.	....	115.5	....	123.1
Oct.	....	115.6	....	123.6
Nov.	....	115.9	....	124.2
Dec.	....	116.2	....	124.6

U.S. Bureau of Labor Statistics.



	1957	1956	1955
Jan.	118.2	114.6	114.3
Feb.	....	114.6	114.3
Mar.	....	114.7	114.3
Apr.	....	114.9	114.2
May	....	115.4	114.2
June	....	116.2	114.4
July	....	117.0	114.7
Aug.	....	116.8	114.5
Sept.	....	117.1	114.9
Oct.	....	117.7	114.9
Nov.	....	117.8	115.0
Dec.	....	118.0	114.7

U.S. Bureau of Labor Statistics.

peacetime, the Industrial Heating Equipment Association, Washington, reveals. The backlog is valued at $110,554,000, a 42 per cent increase over the $77,758,000 of a year ago.

The Resistance Welder Manufacturers Association, Philadelphia, reports its members had a slightly larger dollar volume of orders at the start of February than at the beginning of January. The backlog on Feb. 1 was $12,282,647, compared with $12,162,119 on Jan. 1.

On the Down Side

Not all businesses are on the up side. We're in a period of rolling adjustment—some businesses are flourishing while others are "catching their breath." Production of bituminous coal is lagging 8 per cent behind what it was last year. This is being reflected in railroad car loadings. They are trailing last year's by 5 per cent.

The backlog of orders for railroad freight cars continues to shrink as producers make shipments (see page 72). The order backlog built up more than a year ago when railroads rushed in to beat the expiration of a government program for fast tax amortization on freight cars.

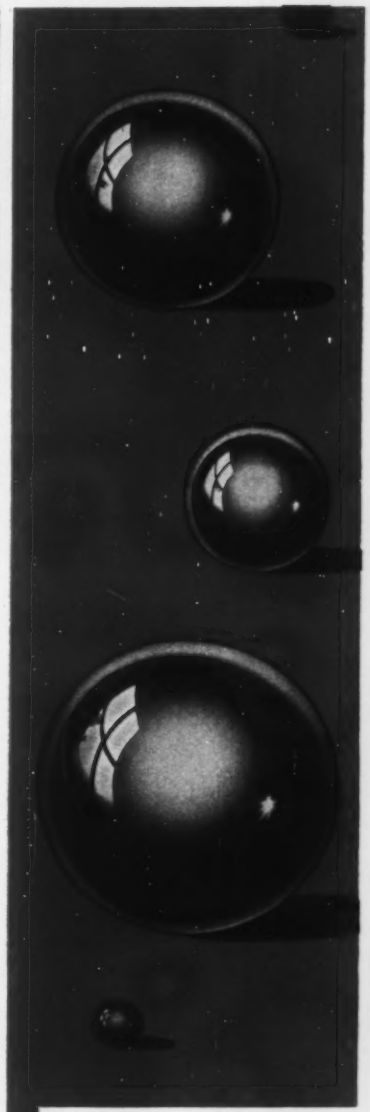
Money To Spend

Helping keep business high is the availability of a large volume of spendable income. Net spendable earnings of factory workers and the buying power of these earnings in January were at record levels for the month, the U.S. Department of Labor's Bureau of Labor Statistics reveals.

Spendable earnings in January, 1957, averaged $74.99 a week for a worker with three dependents and $67.58 for a worker with no dependents.

Net spendable earnings have risen by about $2.90 (4 per cent), since January, 1956, despite a reduction of a half hour in the average work week and a rise in the social security tax.

It took the large amount of spendable earnings to put buying power at record levels for January because prices have been going up (see charts on this page). Wholesale prices advanced 0.5 per cent between December, 1956, and January, 1957, and the consumer price index rose 0.2 per cent.



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JOHN A. ROBERTSHAW JR.
Robertshaw-Fulton v. p.

ROBERT T. DUNLAP
American Wire Fabrics v. p.

JAMES R. KEOUGH
Fenwal v. p.-mfg.

Philip K. McCullough was elected executive vice president and assistant treasurer, **Mercury Mfg. Co.**, Chicago. Formerly vice president-sales, he now supervises all departments and operations of the company.

John A. Robertshaw Jr. was elected a vice president of **Robertshaw-Fulton Controls Co.**, Greensburg, Pa. He was an assistant vice president.

H. T. Ross was named vice president-engineering, **Linde Air Products Co.**, division of Union Carbide & Carbon Corp., New York. He was engineering manager.

R. O. Kennedy Jr. was made sales manager, air impeller division, **Torrington Mfg. Co.**, Torrington, Conn. **Horace W. Whitman** was made general manager, machine division.

Ernest S. Griswold was appointed chief product engineer, cutting tool division, **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He succeeds **John S. Gibson**, now chief engineer of Illinois Tool Works, Chicago.

Thomas G. Kuzma was made Detroit district manager-sales, **Rotary Electric Steel Co.**

Wayne Conway, formerly eastern district manager, Philadelphia, **American Monorail Co.**, was promoted to sales manager-eastern division, Cleveland. **Allen Reinart** replaces Mr. Conway at Philadelphia.

Robert T. Dunlap was elected vice president, **American Wire Fabrics Corp.**, Mt. Wolf, Pa., subsidiary of Colorado Fuel & Iron Corp. He was formerly with Wickwire Spencer Steel Co. and later with CF&I after merger of the two companies in 1945. In 1947 he joined Great American Industries Inc. and served as president and chairman until 1956.

Arthur J. Buckley was promoted to general sales manager, **Pangborn Corp.**, Hagerstown, Md. He was sales manager.

William R. Jennings, factory manager, at **Axelson Mfg. Co.**, Los Angeles, division of U.S. Industries Inc., was promoted to manager, machine tool division.

Quaker State Metals Co., Lancaster, Pa., named **A. D. Hunter** sales manager, sheet and coil division. He was New York district sales manager for Aluminium Ltd.

International Business Machines Corp. appointed **Dana L. Kilcrease** general manager of its new manufacturing plant, Essex Junction, Vt. (near Burlington). He was assistant general manager, Poughkeepsie, N. Y., plant. **William F. Long** was made general manager for the new punched card manufacturing facility to be erected in Sherman, Tex.

William B. Hall, general manager, was elected president-general manage of **Vitro Uranium Co.**, division of Vitro Corp. of America at Salt Lake City, Utah.

James R. Keough was made vice president-manufacturing at **Fenwal Inc.**, Ashland, Mass., with executive responsibility for manufacturing and purchasing for Ashland and Framingham, Mass., plants.

George F. Dublin, former plant manager, **Keystone Brass Works**, Erie, Pa., was named sales manager of its Copperflow Brass Division.

Perry L. Wilson was made purchasing agent of **Pennsylvania Engineering Corp.**, New Castle, Pa. He served with U.S. Steel Corp. in various purchasing capacities for the last ten years.

John E. Johnson was elected vice president-sales, **Datamatic Corp.**, Newton Highlands, Mass. He was director of sales. Datamatic is jointly owned by Minneapolis-Honeywell Regulator Co. and Raytheon Mfg. Co. **Lawrence W. Kelbley** was made director of manufacturing.

George F. Henschel, formerly with American Can Co., joined **National Can Corp.**, Chicago, as vice president-general manager.

Ajax Electric Co., Philadelphia, appointed **Frank W. Springer** assistant purchasing agent. He was assistant to the plant superintendent.

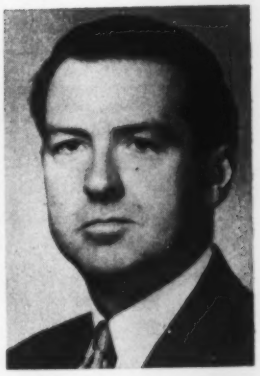
Joseph P. Healey joins **Standard Tool Co.**, Leominster. Mass., to fill the new post of general sales engineer. With headquarters in Buffalo, he will cover all areas of

ELTON H. SELLERS

W. THOMAS GETTIG

positions at Rockwell Mfg.

ROBERT G. CALLISON



FRED J. BURKE

Peters-Dalton appointments

the U.S. except New England and metropolitan New York.

Rockwell Mfg. Co., Pittsburgh, named **Elton H. Sellers** general manager at its Barberton, O., plant to succeed **W. Thomas Gettig**, named assistant to the vice president in charge of the meter and valve division. Mr. Sellers was works manager. **Marshall G. Cook** joined the division as assistant products manager-liquefied petroleum gas products.

Ross Heat Exchanger Division, American Radiator & Standard Sanitary Corp., Buffalo, appointed **Paul W. Wilcox** sales manager; **George G. Van Tuyl**, manager of power equipment sales, eastern region. New products managers are: **M. F. Schobert**, standard exchangers; **L. M. Fletcher**, feedwater heaters; **W. G. Ritchie**, surface condensers and ejectors; **R. J. Riedl**, engineered, Navy and atomic exchangers. **Ernest E. Gustafson** was made division purchasing agent to succeed **R. J. Cheeley**, now purchasing consultant.

Buckeye Tools Corp., Dayton, O., elected **Hal O. Gummere** executive vice president; **Ernest B. Meynard**, vice president-sales.

At **Armco Steel Corp.'s** Middletown, O., Works, **Donald C. Osborne** was named assistant general superintendent in charge of rolling and processing; **Robert S. Hayes**, assistant general superintendent supervising maintenance and services; **Vernon W. Jones**, assistant general superintendent, blast furnace and steel plant operations; **John Poast**, assistant general superintendent in charge of the Hamilton plant.

H. G. Johnstin was made manager of a newly formed metallurgical product development group at **Vanadium - Alloys Steel Co.**, Latrobe, Pa. **Donald F. Griffin** was made assistant manager.

Pfaudler Co., Rochester, N. Y., made **Raymond W. Marks** engineer in charge of glassed steel products; **Jack E. Rowe**, engineer in charge of alloy products.

Allison K. Simons was made director of engineering and research for **Bostrom Mfg. Co.**, Milwaukee.

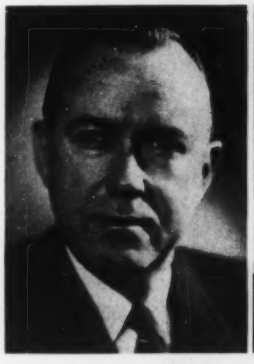
Don Cannon was made manager of the three Chicago plants of **L. A. Young Spring & Wire Corp.**

Robert G. Callison was made chief engineer; **Fred J. Burke**, factory manager of **Peters-Dalton Inc.**, Detroit.

Louis Greenfield was made assistant general sales manager, **Pendleton Tool Industries Inc.** and its affiliates, Los Angeles. **Frank E. Hutton** was made director of research and development. At **Proto Tool Co.**, a division, **Richard E. Reich** was made product sales manager; **Nelson Bartoo**, director of contract sales.

Harry E. Hogue was made assistant operations manager, Dearborn, Mich., division, Sharon Steel Corp.

H. G. Braendel, director of engineering-production, **Wilkening Mfg. Co.**, Philadelphia, was made vice



ALBERT A. THORNBROUGH

J. H. SHINER

H. A. WALLACE

Massey-Harris-Ferguson Inc. executives

Albert A. Thornbrough was elected president, **Massey-Harris-Ferguson Inc.**, Racine, Wis. Formerly a vice president of Harry Ferguson Inc., Detroit, he recently was made president of Massey-Harris-Ferguson Ltd. **J. H. Shiner** and **H. A. Wallace** were elected vice presidents. **C. P. Milne**, vice president-general manager, resigned.

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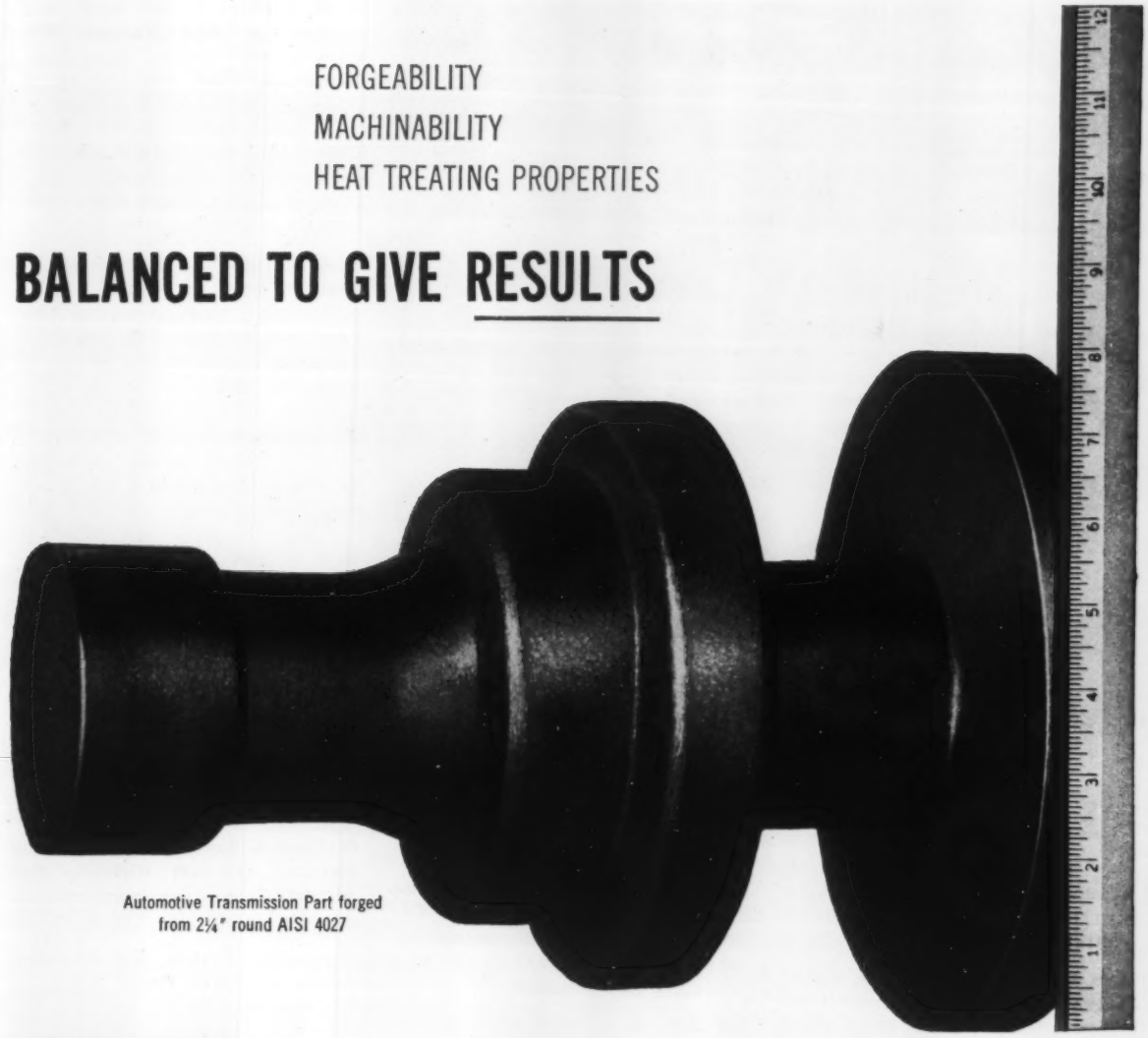

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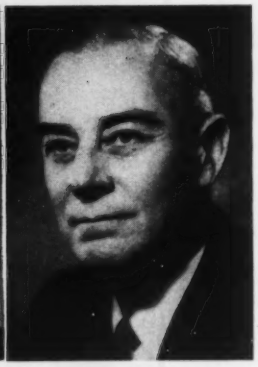
CARL E. TACK
American Steel Foundries eng.

CARL F. NORBECK
Bethlehem Steel supt.

GLENN P. BAKKEN
Chase Brass president



LT. GEN. B. L. BOATNER
Eaton Mfg. post

president-engineering. **J. O. Lutz** was made chief engineer; **H. O. Moffett,** factory manager.

Carl F. Norbeck was made superintendent of the open hearth division at **Bethlehem Steel Co.'s** Lackawanna, N. Y., plant. He succeeds **Joseph L. Walton,** now an assistant general manager at the Johnstown, Pa., plant.

Thomas E. Darnton was made director of purchases, **Oldsmobile Division,** General Motors Corp., Lansing, Mich. He succeeds **A. E. Goossen,** retired.

Crucible Steel Co. of America appointed **William B. Learned** manager of the New Haven, Conn., sales branch to succeed **F. J. Dawless,** who is serving as sales consultant. **George C. Benedict** succeeds Mr. Learned as assistant manager. **Richard G. Frederick** was made manager, Baltimore sales branch.

Patrick M. O'Brien was named general manager, **Basic Tool Engineering Co.,** Los Angeles.

Glenn P. Bakken was elected president, **Chase Brass & Copper Co. Inc.,** Waterbury, Conn., subsidiary of Kennecott Copper Corp. He was executive vice president.

Lt. Gen. B. L. Boatner, U.S. Air Force, ret., was made administrator of engineering for **Eaton Mfg. Co.,** Cleveland. He joined Eaton in 1955 as consultant.

John Zahorjan was named manager of the Joliet, Ill., plant of **Phillips Control Corp.**

Fred L. Brewer was named assistant to the director of purchases, **A. O. Smith Corp.,** Milwaukee.

Joseph C. Guptill was made assistant national product manager, reinforcing products division, **Joseph T. Ryerson & Son Inc.,** Chicago. He is succeeded at the division's San Francisco plant by **Charles E. Nunes.**

Blaw-Knox Co. appointed **W. Earl Dunn** vice president-general manager, chemical plants division, Pittsburgh.

H. D. Emmert Jr. was made chief engineer of **Allis-Chalmers Mfg. Co.'s** steam turbine department, Milwaukee. He succeeds **H. S. Bimpson,** retired.

Robert A. Laws, former assistant chief engineer, was named manager of sales engineering of **Baker-Raulang Co.,** Cleveland.

Carl E. Tack was made chief mechanical engineer, transportation equipment division, **American Steel Foundries,** Chicago. He was made assistant vice president of the division in 1956.

H. Dorsey Hammond was elected vice president - sales, **Arlington Bronze & Aluminum Corp.,** Baltimore.

Bert B. Bevans was elected vice president-production, **Danko Pattern & Mfg. Co. Inc.,** Baltimore.

OBITUARIES...

George E. Williams, 68, chief engineer, forging division, **Transue & Williams Steel Forging Corp.,** Alliance, O., died Feb. 20.

Norman A. Lomas, 56, purchasing manager, aircraft division, **Bell Aircraft Corp.,** died Feb. 12 in Buffalo.

Duncan P. Forbes, 60, chairman, **Gunite Foundries Corp.,** Rockford, Ill., died Feb. 16.

John R. Lowry, 55, assistant to the works manager, Brackenridge, Pa., works, **Allegheny Ludlum Steel Corp.,** died Feb. 14.

G. L. Nankervis, 59, founder of **George L. Nankervis Co.,** Detroit, died Feb. 13.

B. A. Miller, 55, vice president and general manager, **Crown Non-Ferrous Foundry Inc.,** Chester, Pa., died Feb. 17.

Ira E. McCabe, chief engineer and chairman of **Mercoid Corp.,** Chicago, died Feb. 13.

Theo F. Eiszner, 59, president, **Chicago Machine & Washer Co.,** Chicago, died Feb. 15.

Charles A. Gutenkunst Jr., 57, president, **Milwaukee Malleable & Grey Iron Works Inc.,** Milwaukee, died Feb. 16.

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philadelphia 47, penna.

Industry Spends Millions for Research

Additional facilities will be provided to improve quality control, develop new products and techniques, broaden product lines and increase production efficiency

MILLIONS continue to be appropriated by metalworking industries for research, development and engineering.

Thompson Products Inc. is building a research and development center in Euclid, O., as part of a 1957 capital expenditure program totaling $26.5 million. The facility will be completed within five years. Its estimated cost: Over $5 million.

Union Carbide & Carbon Corp. will build a nuclear research center in Sterling Forest (Orange county), N. Y. Major facilities will include: A 5 megawatt pool-type reactor, a radioactive materials laboratory, an ores and engineering laboratory and a building for allied research operations and administrative functions. A contract for the design and construction of the nuclear reactor has been awarded to AMF Atomics Inc., a subsidiary of American Machine & Foundry Co., New York.

Lukens Steel Co. will construct a million-dollar physical testing laboratory at Coatesville, Pa. It will be equipped to test the hardness, toughness, strength, elasticity and internal quality of alloy and alloy-clad steel plates.

North American Refractories Co., Cleveland, has awarded contracts for the construction of a $300,000 research center at Curwensville, Pa. Scheduled for completion in October, it will be used to co-ordinate all phases of quality control and to develop new products.

Expanded research facilities are being installed in Cleveland by **Ferro Corp.** All research on porcelain enamel, ceramic glazes, colors, refractories and cermets will be carried on at the center under the direction of Ralph E. Bevis.

Establishment of a separate research and development department at **Dayton Steel Co.**, Dayton, O., marks the start of a long range program to increase production efficiency, improve the product line and to expand markets. The department will be under the direction of Dr. W. D. Walther. Immediate plans call for the installation of shell molding equipment, permitting automatic operation and an expansion of production facilities. The firm expects to move further into the off-the-road equipment field. Such materials as aluminum and magnesium alloys and the ductile and pearlitic cast irons are earmarked for extensive basic research. Total cost of the new building and equipment will exceed $200,000.

Veeder - Root Inc., Hartford, Conn., established a laboratory in Danvers, Mass., for the design and development of electronic controls, counters and instruments. It is under the direction of J. W. Farmer.

Reeves Instrument Corp., New York, a subsidiary of Dynamics Corp. of America, has completed a $500,000 research and production facility at its Roosevelt Field plant. Its immediate goal will be to develop new and better miniature and subminiature gyroscopes to the microscopic tolerances needed by the most advanced types of military and commercial aircraft.

Beckman Industries Inc. will build a $1.5-million research and development building which will add 100,000 sq ft of working area to its Scientific Instruments Division's plant and corporate headquarters in Fullerton, Calif.

Package Research Laboratory, Rockaway, N. J., has expanded its facilities. Packed products weighing up to 10,000 lb or multiple loads up to 20,000 lb can be tested on equipment installed in the new wing.

Durant Opens New Facility

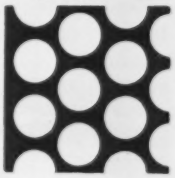
Durant Mfg. Co., Milwaukee, manufacturer of counting and measuring machines, opened a plant at Watertown, Wis., to be known as the Instrument Division. The Milwaukee plant is known as the Industrial Division. Fred L.

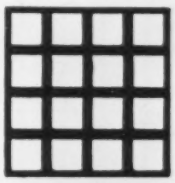
H&K PERFORATED MATERIALS

Utility • Beauty • Economy
FOR TOMORROW'S PRODUCTS

A *MEDIUM* OF LIMITLESS APPLICATIONS

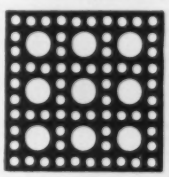
Designers are discovering an ever-increasing range of applications for perforated materials. For functional or decorative purposes, or where a combination of both is essential, H & K perforated materials are used in more products, in more accessories, in more places than ever before.





REDUCES TOOLING COSTS

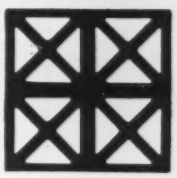
Design, pattern and open area for almost every application may be selected from our thousands of perforating dies—at no charge for tooling. (Tools for special designs can be built to order.)



MATERIALS PERFORATED

Harrington & King can perforate practically any metallic or non-metallic material that can be obtained in coils, sheets or plates . . . from foil-thin to 1" thick.

H & K engineers will be pleased to work with you on your requirements.



See our catalog in Sweet's Product Design File.

FIND NEAREST H&K AGENT IN THE Yellow Pages

Fill in and mail coupon to the nearest H & K office.

Listed Under "Perforated Metals"

THE **Harrington & King** PERFORATING CO. INC.

Chicago Office and Warehouse
5627 Fillmore Street
Chicago 44, Ill.

New York Office and Warehouse
118 Liberty Street
New York, N.Y.

Please send me—

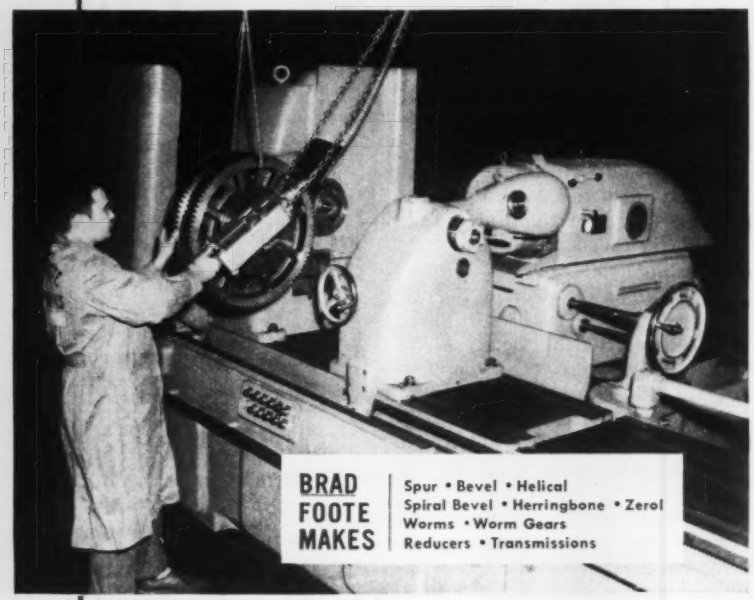
☐ GENERAL CATALOG NO. 62
☐ STOCK LIST of Perforated Steel Sheets

NAME_____
TITLE_____
COMPANY_____
STREET_____
CITY_____ ZONE_____ STATE_____

SPECIAL MACHINES —MEN

2 Reasons Behind Brad Foote Quality

• The craftsman shown below is loading a gear into one of the latest additions to BRAD FOOTE'S long list of special-purpose machines. The only one of its kind in existence, this new shaver can straight or crown shave gears up to 51" in diameter. Normally accommodating gears with shafts up to 142" between centers, it can handle even longer shafts by using special journals. Specially designed, the new machine will shave either internal or external gears.



• Costly special machines such as this are important in providing the extra quality at lowest cost which is the hallmark of BRAD FOOTE gears. But these are only part of the story. Even more important, perhaps, are the men who man these machines—experienced craftsmen with long experience in producing gears to meet the most exacting and specialized requirements.

• BRAD FOOTE'S facilities are at your disposal whether you need one gear or a long production run. We would sincerely appreciate an opportunity to discuss your requirements or quote on your specifications. Your inquiry will receive prompt attention.

BRAD FOOTE GEAR WORKS, INC.

1307 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • Olympic 2-7700 • TWX: CIC-2856-U

subsidiaries

AMERICAN GEAR & MFG. CO.
Phone: Lemont 920
Lemont, Illinois

PITTSBURGH GEAR COMPANY
Phone: SPalding 1-4600
Pittsburgh 25, Pennsylvania

Hubrich is manager of the new division. He is succeeded as Milwaukee plant manager by W. H. Brown.

TC&I To Produce Wire Mesh

Facilities for the production of welded wire mesh are being installed at the Fairfield (Ala.) Wire Works of United States Steel Corp.'s Tennessee Coal & Iron Division. Equipment includes two 156-in. fabric welding machines and auxiliary equipment. Of the electric welding type, the machines will have a combined annual capacity of about 18,000 tons. These facilities are expected to be placed in operation during the third quarter.

Shaw Licenses Three Firms

Shaw Process Development Corp., Port Washington, N. Y., has licensed three firms to produce precision investment castings by the Shaw process: Deloro Stellite, Belleville, Ont.; Hitchiner Mfg. Co., Milford, N. H.; and Arwood Co., New York.

Equipment Maker Builds Plant

Omer E. Robbins Co., manufacturer of angular toolroom equipment, completed a 10,000 sq-ft building at 24800 Plymouth Rd., Detroit. Increasing volume in the company's line of special automatic assembly machines necessitated the expansion, says O. E. Robbins Jr., vice president and general manager.

Carpenter Opens Warehouses

Carpenter Steel Co., Reading, Pa., opened an enlarged mill-branch warehouse in St. Louis. It will be stocked with tool, stainless and alloy steels. L. E. Cooney is district manager and Paul Holtz, assistant district manager with offices in Chicago. W. J. Stephens is branch manager and Arthur Hunnius, warehouse manager, in St. Louis.

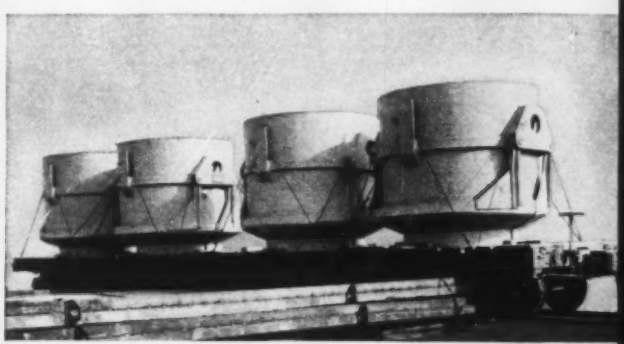
The company has opened a new mill-branch warehouse in Toledo. It's under the jurisdiction of H. R. Potter, district manager, who is located in Cleveland. J. R. Garinger continues as the Toledo rep-

STEEL PLATE *Fabricating Facts!*

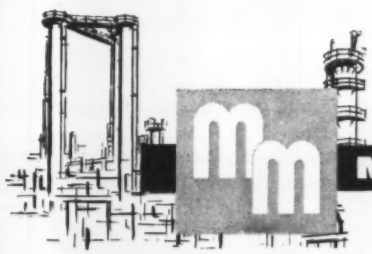
McGREGOR-MICHIGAN Brochure Describes Diversified Facilities and Production

In this compact 12-page brochure you'll find valuable information on McGregor-Michigan's equipment and typical steel plate fabrications. It shows scenes in our new 30,000 square foot Heavy Fabricating Plant and our original Rivard plant. It describes some of our new equipment including a 650 ton press brake and our 600 ton "Bulldozer" horizontal forming press capable of forming heavy beams or solid sections. In addition you'll find clear illustrations of steel plate fabrications for the primary metal producers—ladles, buckets, hooks, doors, water-cooled roof rings and others—and equally interesting chemical and petroleum processing equipment—ASME Code vessels, autoclaves, heat exchangers, kettles and tanks. Many of these assemblies run to 50 tons and over, in mild, stainless and alloy steels. Typical miscellaneous industrial fabrications shown are engine beds, bases for machines, jigs and fixtures, heavy-wall cylinders, foundry cupola shells, furnace casings, a self-propelled sewer tunnel shield and a heavy boom for a power shovel. The brochure also describes our plate warehousing and specialized surface treating services.

We would appreciate your including this informative booklet in your file of fabricating sources. Please send for a copy and the name of our representative nearest you or call direct for prompt service on any steel plate fabricating problem.



Clam shell charging buckets destined for leading West Virginia aluminum plant.



SINCE 1841

McGREGOR-MICHIGAN CORPORATION

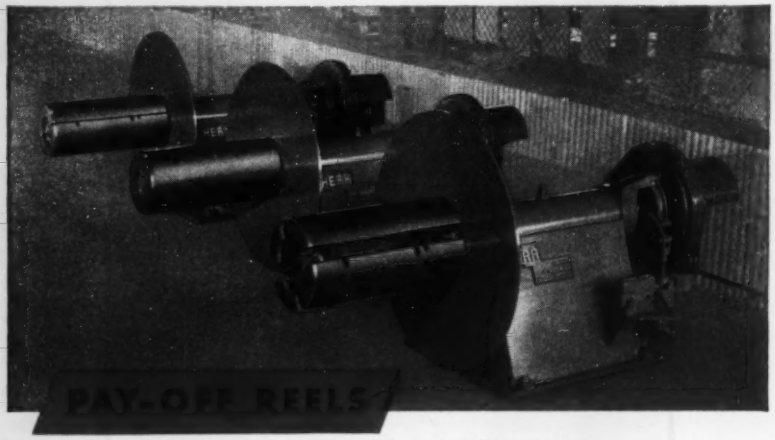
5919 RIVARD • DETROIT 11, MICHIGAN

TRINITY 2-2400

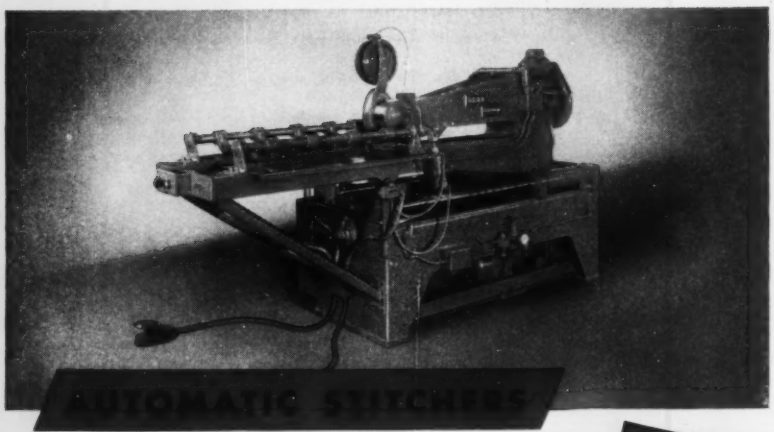
STEEL PLATE FABRICATING AND WAREHOUSING

HERR EQUIPMENT

"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"



Types and sizes for coils weighing from 5,000 to 50,000 lbs. and up to 84" wide. Fixed, adjustable or automatically aligning bases. Timken bearings. Can be equipped with threading drive, also automatic speed compensating drive for feeding presses.



Fast, dependable method of fastening the lead end of a new coil to the trailing end of a preceding coil. Entirely automatic. Produces a double row of locked stitches. Practical for strip of any width. Your samples stitched and returned promptly. Also automatic welders.

Write for fully descriptive Bulletin No. 561 today!

THE HERR EQUIPMENT CORPORATION

1250 VINE STREET • WARREN, OHIO

CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA

resentative, assisted in the warehouse operation by J. G. Werner.

Kaiser To Make Oxygen Gun

Henry J. Kaiser Co.'s Kaiser Engineers Division has signed an agreement with the Steel Co. of Wales Ltd. to manufacture and promote the sale of the P. T. oxygen gun for open hearth steelmaking.

Buys Earth Drill Business

Mobile Drilling Inc., Indianapolis, purchased the earth drill business of Allis-Chalmers Mfg. Co.'s Buda Division, Milwaukee. No other products of the Buda Division or of Allis-Chalmers Mfg. Co. are involved in the transaction.

New Southwest Warehouse

Metal & Thermit Corp., New York, announces a new warehouse and sales office at Houston. John A. Watson Jr. is in charge. A complete stock will provide better service to M&T's customers in the Southwest.

Canadian Firm Expanding

Canadian Car & Foundry Co. Ltd., Montreal, Que., has awarded a general contract for a three-year modernization program. Extensive structural additions will be made to the plant, and a number of buildings and shops will be erected.

Opens Steel Warehouse

Gateway Steel Co. has opened a warehouse in McKees Rocks, Pa. This new Pittsburgh area distributor carries stocks of flat-rolled steel. Later, it plans to distribute structural shapes and plates. Officers are: W. M. Schaefer, president; W. C. Taylor and Jack Vaniver, vice presidents; Harold Maile, general manager.

Forms Nuclear Engine Lab

United Aircraft Corp., East Hartford, Conn., established its nuclear engine program as a separate operation of its Engine-Building Division. B. A. Schmickrath is general manager of Connecticut Aeronautic Nuclear Engine Laboratory (CANEL) to be set up at

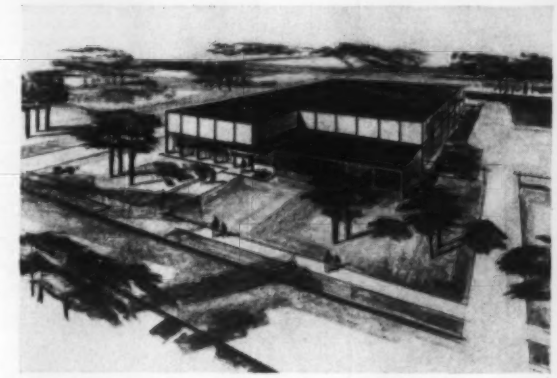
(Advertisement)

PENCO NEWS

"SERVING INDUSTRY FOR OVER 40 YEARS"

FROM AMERICA'S LARGEST INDEPENDENT TOOL STEEL DISTRIBUTOR

Peninsular's Services Available To Every Tool Steel User in the Midwest



Peninsular To Expand In Seven Areas

We have retained the architectural firm of Robert L. Svoboda, Detroit, to design a truly modernistic, daylight type of building—to provide both office space and an adequate warehousing area for steel stocks in each of 7 branches.

This expansion program will include office and warehouse projects in Cleveland, Toledo, Dayton, Akron, Indianapolis, Grand Rapids and Buffalo.

Construction of these new facilities is well under way. We have been assured that the entire expansion program will be completed as rapidly as possible, so that we can better serve the Metalworking Industry.

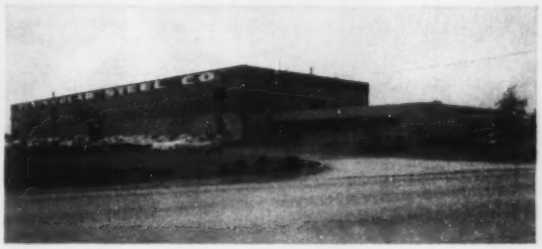
All buildings will be similar in design, and follow closely the design as shown in the above photograph.

Ten Other Warehouses To Serve The Midwest

Peninsular also warehouses complete tool steel stocks in nine other industrial cities in the Midwest:—Grand Rapids, Chicago, Rockford, Indianapolis, Toledo, Dayton, Akron, Cleveland and Buffalo, to serve you.

Now, wherever you're located, in this great industrial area, your tool steel needs can be satisfied instantly, by either the Detroit warehouse, or one of 9 branches.

Peninsular tool steels are just minutes from your plant, and a telephone call will send them on their way. And, we'll gladly help you with any tool steel problems, too.



Detroit Headquarters Office and Warehouse

It's one of the most modern steel warehouses in the entire Midwest. It's designed to serve the tool steel needs of the greater Detroit area, and house the headquarters of the Peninsular Steel Co. You can visualize its size, when we tell you that 3 freight cars can be unloaded, at one time, inside this warehouse, at the far end.

Metallurgical Department To Serve Your Every Need

Facilities of our complete Metallurgical Department are available, at our headquarters in Detroit, to serve you. We're constantly analyzing the properties of our various tool steels, and testing them in terms of your specific needs. Mr. George J. Danis, Chief Metallurgist, supervises the activities of our Metallurgical Department.

For further information, write Peninsular Steel Company, 24401 Groesbeck, P.O. Box 3853, Detroit 5, Michigan.

Super-Pressure Tubing—Economical and Dependable for pressures as high as 100,000 PSI

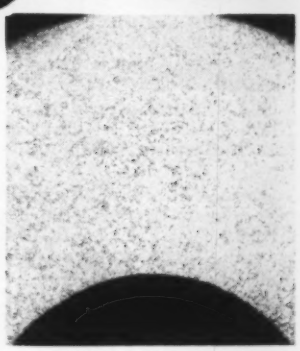
**Avoid costly machining and drilling—
Superior can supply the tubing you need!**

TUBEXPERIENCE IN ACTION

Here's how *you* can take the high cost out of high-pressure installations. No more machining and deep-drilling of stainless steel bar—that's old fashioned and expensive. For high-pressure autoclaves and in research labs where pilot equipment for hydrogenation and polymerization processes require high pressures, Superior super-pressure tubing is cutting high costs, helping avoid critical failures and downtime.

Superior super-pressure tubing offers long service life, high fatigue strength, excellent corrosion and chemical resistance. Available in single wall or composite wall (shown above), it is designed to carry internal pressures ranging from 15,000 to 100,000 psi, in OD sizes ranging from .125 in. to .750 in. Primary advantages of single wall tubing are economy and reliable service, plus long life, at recommended maximum working pressure for a given size. Composite wall tubing, used for extra-high pressures, offers the advantages of combining different materials. For example, the inner wall can be highly corrosion resistant, while the outer wall, not exposed to such corrosion, can be of a more economical material. Analyses for Superior super-pressure tubing include stainless steel Types 304, 316, 321 and 347 and AISI 4130 alloy steel.

Why not call on our long practical experience with super-pressure tubing. We can help you with virtually any tubing problem that confronts you. For more super-pressure tubing information, get your free copy of Data Memo 22. Write Superior Tube Company, 2005, Germantown Avenue, Norristown, Pa.



Unretouched photomicrograph shows etched section of Type 304 stainless steel super-pressure tubing at a magnification of 50x. Note smooth, uniform ID and fine grain structure.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010" to ⅝" OD—certain analyses in light walls up to 2½" OD

West Coast: Pacific Tube Company • 5710 Smithway St., Los Angeles 22, Calif. • RAymond 3-1331

the new Air Force sponsored facility in Middletown, Conn. C. E. Holtsinger is chief engineer for CANEL operations.

Diecasting Firm To Expand

Atlas Die Casting Co., Germantown, O., plans to spend $100,000 on capital equipment, making possible a 30 per cent increase in production. The firm makes zinc and aluminum castings for several large companies.

Du Pont To Build Silicon Plant

E. I. du Pont de Nemours & Co., Wilmington, Del., will build a plant near Brevard, N. C., for the production of hyperpure silicon, a vital part of many electronic and electrical devices. F. H. Weismuller is general manager of the Pigments Department which will operate the facility. The plant is expected to produce about 50,000 lb of semiconductor grade silicon annually.

Skillcraft Ltd. Renamed

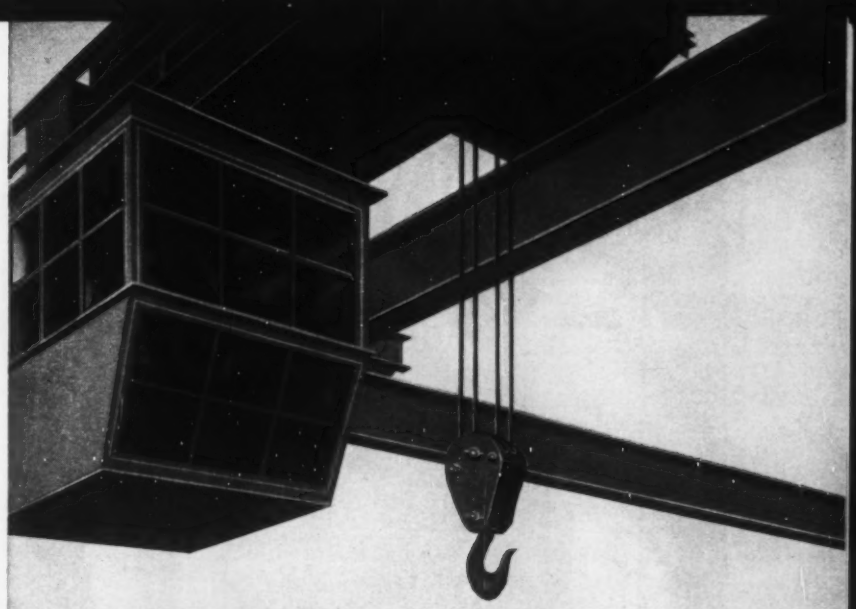
Skilcraft Ltd., St. Catherines, Ont., a subsidiary of McKinney Mfg. Co., Pittsburgh, changed its name to McKinney-Skillcraft Ltd.

GE Enlarging Foundry

General Electric Co. has started a $200,000 project at its foundry in Elmira, N. Y. The program involves installation of a molding machine which uses compressed air and a rubber diaphragm to press sand over patterns to form strong molds. The mold operation is part of a $450,000 modernization plan which includes enlargement of the pattern shop, installation of a new mold conveyor and new pouring equipment.

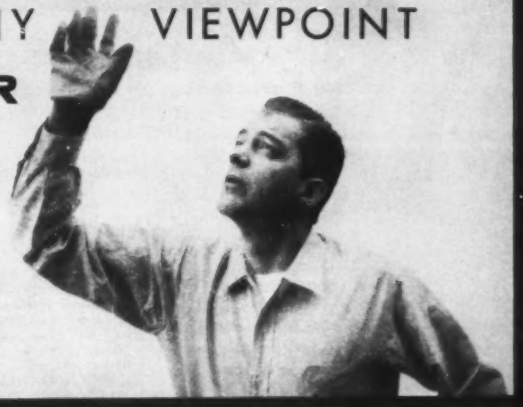
Speeds Raw Material Handling

Extensive improvements in facilities for handling raw materials and molten iron will be made in the blast furnace department of United States Steel Corp.'s Duquesne (Pa.) Works. A new railroad car dumper and a conveyor belt system will be installed to streamline the unloading and distribution of such raw materials as iron and manganese ores, sinter



The **operator** of a Conco engineered Crane can be safer, more productive, less fatigued. There's the safety of true vertical hook travel, of s-m-o-o-t-h travel and lift. There's the safety of design based on deflection limits, often exceeding standard factors of safety. Production is speeded by application-engineering that combines the right speed, span, lift, travel and clearance. Over 37 years experience are behind features which makes Conco Cranes first with operators. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.

FROM ANY VIEWPOINT
A FINER CRANE



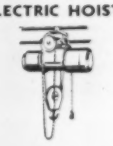
CRANES HOISTS CONCO

Conco Engineering Works

Division of H. D. Conkey & Company
70-14th Ave., Mendota, Illinois

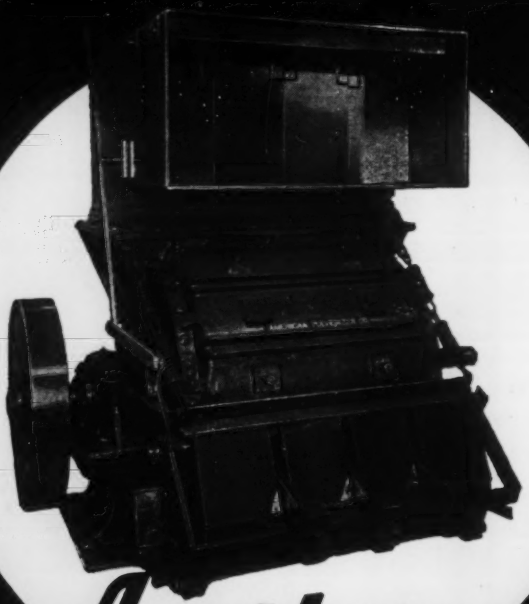
AFFILIATES: Conco Engineering Works–Domestic Heating Equipment • Conco Building Products Inc.,–Brick, Tile, Stone

JIB CRANES | ELECTRIC HOISTS | CHAIN HOISTS AND TROLLEYS | HAND GEARED CRANES | CRANE ASSEMBLIES



CASH IN YOUR CHIPS

Change Metal Turnings Waste into More Profitable Shoveling CHIPS



American METAL TURNINGS CRUSHERS

No progressive, profit-conscious company—who produces 10 or more tons of metal turnings per month—can afford to ignore the profit potential of a modern chip salvage system . . . with an American Metal Turnings Crusher at the core.

American installation profits include: $4 more per ton for chips than for machine turnings; up to 50 gallons per ton in cutting oil recovery; 75% less storage; easier, faster handling.

How many profit dollars are you losing under present operations? If, for example, you're currently producing 20 tons of turnings a month . . .

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings per Year (20 tons/month at $4 extra per ton)	$ 960.00
6,000 Gallons Recovered Cutting Oil at 30¢/Gal. (50 gals. per ton x 240 tons = 12,000 gals. Half of this, 6,000 gals., can be credited to use of chips instead of turnings in reclamation)	$1,800.00
Estimated Savings in Manpower, Storage, Tools, Maintenance, Freight, etc.	$ 300.00
TOTAL GROSS PROFIT	$3,060.00

WRITE for Metal Turnings Crusher Bulletin.

American PULVERIZER COMPANY

Designers and Manufacturers of Ring Crushers and Pulverizers

1539 MACKLIND AVE. • ST. LOUIS 10, MO.

and limestone. Closed mixer ladles, each with 175-ton capacity, for transporting molten iron from the blast furnaces to open hearth furnaces will replace 35-ton ladles in use.

Hamant Tool Leases Building

Hamant Tool Co. has leased a building at 514 Warren St., Dayton, O. The firm makes grainer machines for the cabinet industry.

Will Build in Ontario

International Harvester Co. of Canada Ltd. plans to build a district office and service headquarters at North Bay, Ont. G. A. Martin is branch manager.

Buys Into N.R.C. Metals

National Research Corp., Cambridge, Mass., and Columbia-Southern Chemical Corp., Pittsburgh, have become associated as equal stockholders in N.R.C. Metals Corp., formerly a wholly owned subsidiary of National Research Corp. N.R.C. will produce and sell zirconium and hafnium metals to the Atomic Energy Commission and other customers. It is building a plant near Pensacola, Fla., for the production of zirconium and hafnium.

Increases Plant Space

Magnaflux Corp., Chicago, has completed an addition to its main plant which increases the assembly area by one-third.

Kaynar Building Plant

Kaynar Mfg. Co. Inc., maker of self-locking nuts and pin curl clips, is building an 80,000 sq-ft plant at 7801 Telegraph Rd., Rivera, Calif. The combined land, building and equipment represents an investment of more than $2 million.

Adds Metallurgical Laboratory

A metallurgical laboratory has been added to the facilities of Alloy Steels Inc., Detroit. This warehouse carries stocks of tool steels, high-speed, stainless and alloys. Laboratory equipment includes machines for hardness testing, surface

For Faster, Safer, More Economical

METAL CLEANING...

USE TRIPLE-ACTION, NON-FLAMMABLE, *LOW COST*

IMMUNOL

(Reg. U.S. Pat. Off.)

Cleaning and polishing metal parts with IMMUNOL

Cleaning and rustproofing in a tumbling operation with IMMUNOL prior to plating

Using IMMUNOL to remove grease from cold finished bar stock in a dip tank operation

IMMUNOL quickly cleans soils, gummy deposits, dirt and foreign matter from any metal surface...*thoroughly degreases metal...leaves a protective rustproof coating as it cleans*—all in one operation! In addition, IMMUNOL:

- **ELIMINATES *the fire hazard* of solvents since it is non-flammable.**
- **REPLACES MORE EXPENSIVE, less efficient soaps, alkalies and solvents.**
- **IS NON-TOXIC so operators can use it without fear of skin irritations.**
- **IS ODORLESS to increase operator efficiency.**
- **IS INEXPENSIVE. Only a few ounces of IMMUNOL per gallon of water are required to produce a gallon of solution. This solution can be used over and over again once the foreign matter has been removed.**
- **IS NEUTRAL CHEMICALLY having a pH of 7.0.**
- **IS MIXED WITH HOT OR COLD, HARD OR SOFT WATER.**

Here are just a few unsolicited comments from IMMUNOL users: "We estimate IMMUNOL saves us $30,000 to $40,000 per year in materials, time and labor"; "IMMUNOL saves $700 per week over vapor degreasing"; "I account for the terrific improvement in a simple operation to the better cleaning by IMMUNOL."

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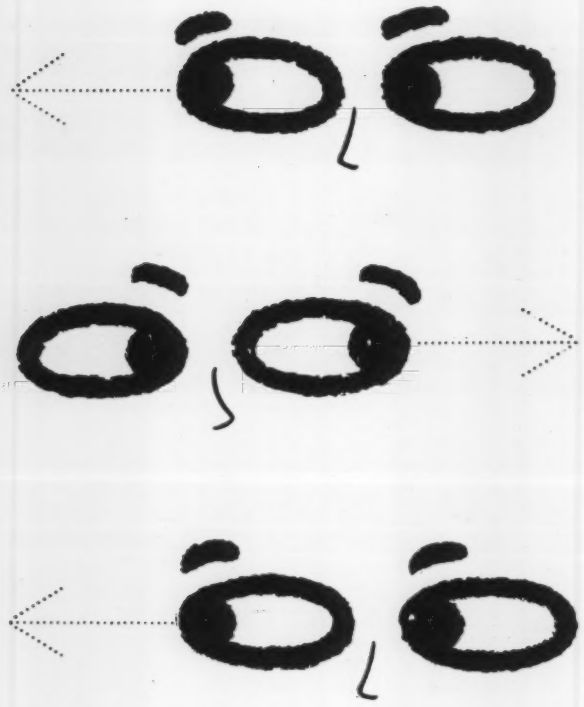

Alternating stresses bear watching!

Back and forth . . . up and down . . . in and out . . . if those stresses keep changing, the life of a metal part is a hard one . . . and often a short one. Stress reversals can cause "fatigue" failure at stresses far below the expected strength of the metal.

One of the outstanding properties of phosphor bronze is its high resistance to fatigue failure. It is widely used for electrical switch parts, relay contact springs, bellows, rotating shafts and other moving or vibrating parts.

For detailed information on phosphor bronze, write to Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.

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grinding and polishing; microscope and microphotographic equipment; a hot acid macroetch unit; and auxiliary units necessary for the preparation of specimens. J. E. Carter is in charge of the laboratory.

NEW ADDRESSES

Inertial Instruments Inc. moved into a new plant in Santa Monica, Calif. Production of flowmeters will be increased and a substantial flow test laboratory will be put into operation.

Link-Belt Co., Chicago, moved its Louisville district office to larger quarters at 235 E. Burnett St., that city. Emmart LaCrosse Jr. is district manager.

CONSOLIDATIONS

Standard Steel Treating Co. purchased **Steel Treat Inc.** Both are in Detroit. The new plant has 17,000 sq ft of floor space and a daily capacity of more than 100,000 lb. All the necessary secondary heat treating operations are available.

American Machine & Foundry Co., New York, is consolidating three subsidiaries into one organization, AMF Wheel Goods Division. The merging units are: **Junior Toy Corp.,** Hammond, Ind.; **AMF Cycle Co.,** Little Rock, Ark.; and **BMC Mfg. Corp.,** Binghamton, N. Y.

Food Machinery & Chemical Corp., San Jose, Calif., has acquired over 98 per cent of the outstanding shares of **Oil Center Tool Co.,** Houston, a major producer of wellhead equipment. This is part of Food Machinery's planned expansion in the petroleum equipment industry.

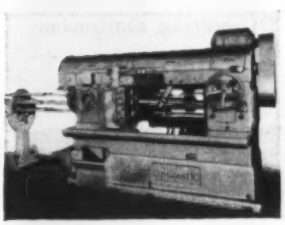
American Gage & Machine Co., Chicago, acquired **Standard Transformer Co.,** Warren, O., manufacturer of transformers for public utilities. The announcement was made by American Gage's subsidiary, Simpson Electric Co., Chicago.

61 models

A machine not put to its best use is theoretically idle. Proper machine selection is an important factor in the profitable use of a multiple spindle automatic. So extensive are the demands on this type of lathe that no single model—or number of models—can be expected to efficiently handle the wide range of work available.

To excel in any range of work a multiple spindle automatic must be specifically designed for that range. That is why CONOMATICS are provided in so many models. In no other way can the purchaser be assured of the best possible machine for his particular requirements.

Write for your copy Today



Conomatic

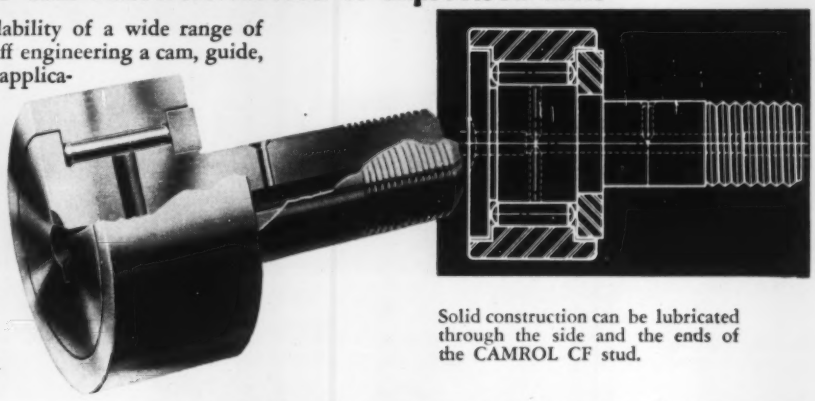
CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

BEARING TIPS by McGill

For convenience, with savings in time and cost

Use McGILL® CAMROL Cam Followers instead of improvised units

Simplification of design with availability of a wide range of standard bearings takes the strain off engineering a cam, guide, support or track roller bearing application. No need to "build up" a special unit when you can select the proper size standard CAMROL bearing engineered especially for the job. McGill's CAMROL bearing construction offers full type capacity, with provision for shock, in a compact precision unit. Specify CAMROL, the original cam follower, in either CF (with stud) or CYR (shaft mounting) series. Sealed and prelubricated bearing available also.



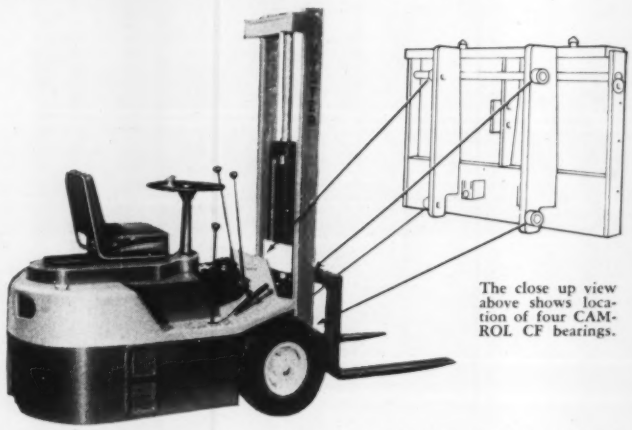
Solid construction can be lubricated through the side and the ends of the CAMROL CF stud.

YR bearings help F-100 Super Sabre make slower and safer landing

The supersonic speeds obtained by today's modern aircraft set up design problems not encountered with older, slower planes. The overall streamlined design required for speed in flight, for instance, necessitated finding ways of supporting the North American F-100 Super Sabre at low air speeds required for landing. A

series of slats on the leading edge of the wing, providing greater lift at lower air speed, was the answer. Each slat is supported by McGill CAMROL YR bearings — especially designed to permit shaft or yoke mounting. These long-life bearings carry the loads of these slats as they move on tracks during flight of the Supersonic F-100.

CAMROL CF bearings out-perform friction rollers as fork support bearings



The close up view above shows location of four CAMROL CF bearings.

Small size and high load-carrying unit construction with simplified lubrication are among principal benefits obtained by Hyster Company from use of CAMROL CF bearings as fork support rollers in its Hyster 20 and other lift trucks.

Two bearings ride up and down inside each vertical mast section to position the lift truck fork under load. Speeds are relatively slow but the crushing loads on each bearing are heavy.

In this particular application, the exterior surfaces of the bearings are treated with a black oxide finish. This provides corrosion-resistance which serves to augment maintenance-free operation, a characteristic of CAMROL bearing construction.

Fact-packed Bearing Catalog

Write for your copy of Catalog 52-A, a revised, 128-page Bearing Selection Guide.

Insure performance with McGILL®

MULTIROL® GUIDEROL® CAMROL®
Precision Needle Bearings

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Technical Outlook

NEW JET METAL—Westinghouse engineers have developed a new metal for jet engine turbine discs that could add 100 mph to top speed because of increased operating temperature, says Dr. J. T. Brown of the materials development department. Called W545, it is a modified version of Westinghouse's Discaloy. In tests, samples withstood 75,000 psi stress at 1200°F for 300 hours.

INCREASES FATIGUE— Guide rods in long coiled springs greatly reduce the life of springs subjected to fluctuating loads, says the National Bureau of Standards. An analysis showed that contact of the guide rod with the inside of the spring was the most important cause. In the tests, all failures were in the first third of the spring adjacent to the fixed head, where the rubbing action was greatest.

STAINLESS PROPELLER BLADES—They passed the test on the Great Lakes ore carrier, *Arthur M. Anderson,* this season. Four of them (weighing about 3 tons each) were bolted to the propeller hub. Large ships generally use one-piece blades made of high tensile nonferrous materials. The operator, Pittsburgh Steamship Co., reports that the highly polished, separable blades were efficient.

TITANIUM FIRES—A recent report from the Titanium Metallurgical Laboratory operated by Battelle Memorial Institute, Columbus, O., gives advice on handling titanium. It discloses that chips, turnings, filings or drillings will ignite and sometimes burn intensely. More massive forms are difficult to ignite. Titanium sponge will ignite under certain conditions. Powdered titanium (like some other powdered metals) may explode when finely divided particles are dispersed in air. There is no way to extinguish such a fire, but it can be controlled with dry powders. AEC recommends dolomite or powdered limestone.

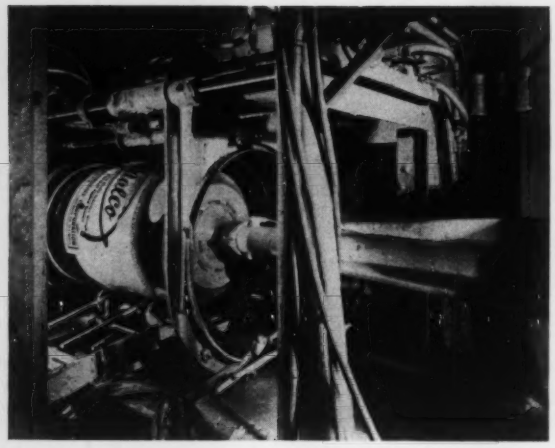
NEW FUEL ELEMENT— Norton Co., Worcester, Mass. says it will show its ceramic fuel element for the first time at the Western Metals Exposition (Los Angeles, Mar. 25-29). The company believes it is the first ceramic-type fuel element to be commercially available.

EXTRUDED ECONOMY—An airplane manufacturer cut machining time on fuselage stringers 75 per cent by using extruded steel sections. He had been machining them from bar stock. The small T-shaped section (SAE 8630 steel) is extruded at the Watervliet (N.Y.) Works of Allegheny Ludlum Steel Corp.

STAINLESS IN BRIDGES— Some of the columns in bridges along the Indiana Toll Road rest on stainless steel balls so they can move freely in all directions. The balls (some are almost a foot in diameter) are grooved in three directions to hold lubricant, which is expected to last the life of the bridge. Advantages claimed: Bridges are shorter, less costly to build.

STAINLESS AGAIN— Ford's new cooler for automatic transmission oil marks another advance for stainless in the automotive field. The Type 430 part is in the bottom of the radiator shell. Part of the radiator and oil rings for pistons are also stainless firsts on 1957 models.

Metalworking Outlook—p. 47 *Market Outlook—p. 149*



Automatic spraying unit achieves a high degree of film uniformity throughout the length of the container

Container linings are cured by "vertical bake" in this oven. Each drum serves as auxiliary oven flue

Metal Drums Coated Centrifugally

They are held stationary while a spinning rotor travels through them and sprays on atomized coating. Lining thickness is held to plus or minus 0.0001 in.

CENTRIFUGAL spraying has solved the problem of accurately controlling the coating thickness in lined metal drums.

Developed by Rheem Mfg. Co., New York, the machine mechanically atomizes the coating material and applies it to a thickness within a 0.0001 in. tolerance. With conventional spraying techniques, the drum is rotated and the spray gun moved across the rotating surface. Uncontrolled air turbulence is created. It is eliminated by centrifugal spraying.

Rotor Head—Heart of the sprayer is a dynamically balanced rotor head, 16 in. in diameter and 2 in. wide, which spins at 3600 rpm. Paint or coating material is fed into the head and is atomized as it is cast off through a fine drilled-Monel screen.

Coating takes place with the drum held stationary in a horizontal position. The rotor travels through the drum, spraying on its forward and return strokes. Distance from the inside surface of the drum to the spinning rotor is about 2½-in.

Less Solvent—"The precision control we have in the new technique permits the use of a lining material with lower solvent content. This decreases the inherent difficulties in solvent evaporation —such as pinholing and blistering —during the curing process," says E. F. Paquette, vice president-general manager of the container division.

Theoretically, say Rheem officials, any coating material that can be made to adhere to steel can be applied by centrifugal spraying. Rheem is working with about 50 materials, including phenolics and vinyls.

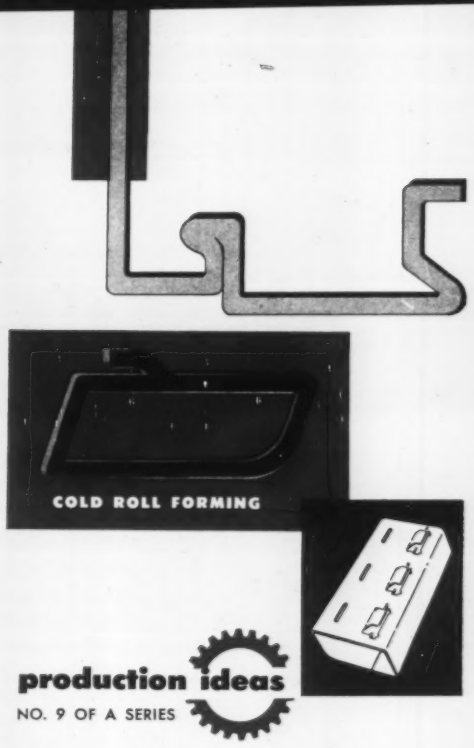
Coatings can be applied in thickness of ¼ to 4 mils. Factors which control thickness are the amount of liquid fed into the rotor, viscosity and coating speed cycle. The surface to be coated is prepared conventionally—Rheem uses shotcleaning.

Operation—Coated drum shells (the bottoms are not put on until after the coating process is complete) move by conveyor out of the spray booth to a Newcomb-Detroit curing oven—145 ft long, plus a 23-ft cooling section.

Drums travel in a vertical position, three abreast on a chain conveyor through the oven—each drum shell serves as an auxiliary oven flue, inducing a continuous flow of controlled heated air across the lining. Solvents in the coating material are removed rapidly, eliminating porosity and blistering. Condensation of volatile resin components also is eliminated.

Curing temperatures and time cycles will vary with the coating. In applying a clear phenolic to a 55-gallon drum, coating speed is about 470 units per hour through the spray booth; curing is done at 400°F (metal temperature) for about 14 minutes. The curing cycle, including the preheating, firing and cooling, is about 28 minutes.

Cold roll forming is being used to produce a diversity of parts—from automobile wheel rims and frames to shells for refrigerators. It's an easy way to cut costs



Make Complex Shapes in Continuous Strips

THE box section above is an example of how industry is using cold roll forming today.

Cut to length and joined, the section is part of the seat frame for the 1957 Chevrolet. From strip to part, it's a continuous process with a cold roll former right in the middle.

Known officially as the McKay seat frame line, it consumes 70 ft of strip a minute.

Defined — A cold roll former progressively folds and presses a flat strip of metal into a continuous shape. Products made from such shapes are legion: Decorative trim, welded pipes and tubes, hat-shaped and zee sections for airplanes, all kinds of metal windows, furniture, roof and siding panels for buildings.

Here are some advantages of the method.

1. It's economical. Forming a complicated shape from strip by any other means is relatively expensive. One operator and a roll former can produce up to 60,000 ft in 8 hours.

2. It doesn't injure fine surface finishes. Often, you can start with plated, painted or polished strip and be sure that the finished piece won't be marred or scratched.

3. It produces parts that have a higher strength-to-weight ratio than those which are hot rolled or extruded. Metal thickness is more uniform, some work hardening takes place, and part dimensions are more accurate. It's not unusual to find tolerances of plus or minus 0.005 in., although plus or minus 0.015 in. is more common.

4. The former is simple to operate. Early machines required great skill. Roll adjustment was considered an art. Today, standardization and adjustment aids make it possible for an average workman to become a skilled operator in a few weeks. Most machinery makers provide instructors.

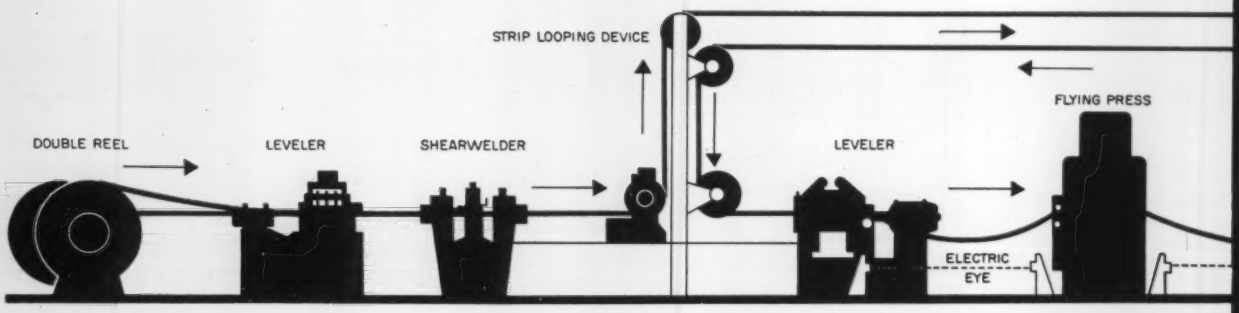
Machinery — Makers (there are less than a dozen) have developed a wide variety of standard equipment. On such machines you can roll form metal as thin as 0.005 in., or annealed mild steel as thick as ¾-in. Widths up to 80 in. are practical.

There are special machines that handle thicker metal. But the greatest volume of products is made from strip less than 0.125 in. thick and narrower than 20 in.

Standard machines may have 3 to 30 spindles (or stations) for the rolls or forming dies. There are two types—inboard and outboard.

Outboard machines are good for the lighter, easy-to-form gages. A great many are used to make Pittsburgh and snap-lock seams in sheet metal products for the heating and air conditioning industry. The big advantage of an outboard type is accessibility—it's easy to set up. First cost is lower, too.

Inboard machines predominate because their spindles deflect less



The McKay seat frame line forms, pierces and welds a box section which is used in passenger car seat frames. Installed at the Fisher Body Division's Grand

than those of the outboards under heavy loads. The chief advantage of the outboard (easy setup) is minimized by the nature of the operation—change-overs are infrequent.

On a number of models, the entire spindle and support unit can be removed easily from the base of the machine. The number of rolls required to make different shapes varies.

Universal — Each spindle and support unit contains an upper and lower spindle driven by a gear train which can be adjusted for variations in the distance between the two rolls. Each stand is connected to a common drive by universal or flexible couplings.

The upper and lower rolls are not always the same diameter. The reason is simple: A given machine can make a deeper section if the lower roll is smaller. For such machines, the gear ratio has to be varied and the usual, unequal gear ratio (Yoder Co., Cleveland) is about 1.33 to 1.

Many fabricators like maximum versatility, so they buy the unequal gear ratio. The other type is used mostly in plants which have adequate work for one size or shape, or the work is of shallow draft—like light trim for automobiles and furniture.

Increasing Efficiency—You can add many devices to a former, including straighteners, starter guides, idler rolls, coilers and ring formers.

Rolls can be designed to do a limited amount of piercing and forming. Weeper holes in aluminum house siding are an example. Pierced holes for self-tapping screws are another.

Manufacturers report varying success with rolls that notch, pierce and form. Roll Formed Products, Youngstown, says it has had considerable success.

In practice, you frequently find up to three shapes, side by side, on a single spindle. It's a simple device to avoid setup time.

Guides—Any roll forming machine needs something to guide the metal into and out of the rolls. Guides align the strip as it enters the first pair of rolls, prevent deflection between roll stations, prepare it for entry into the next roll station and prevent twisting and curving at the exit.

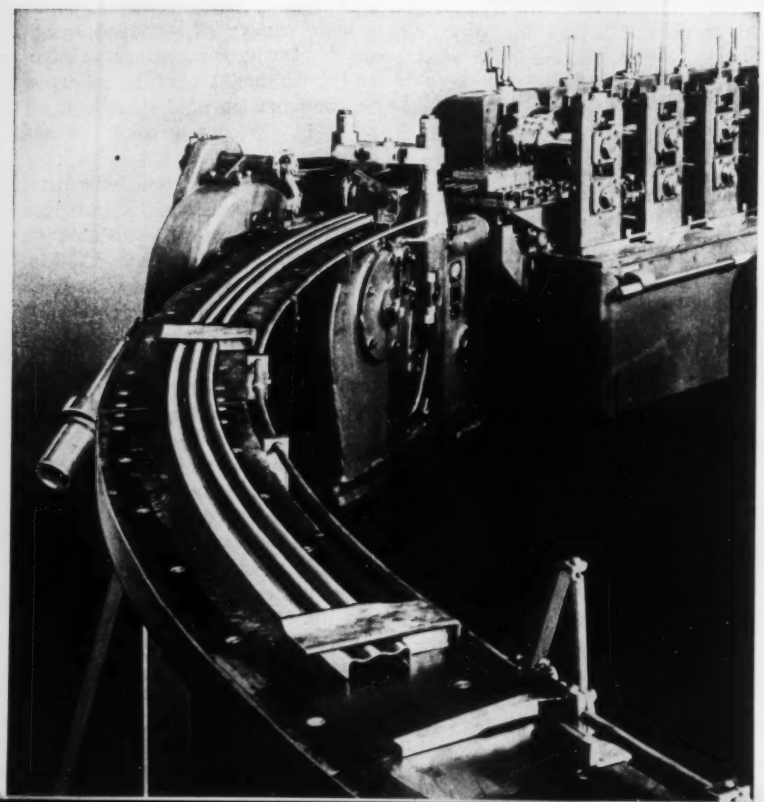
There are two types: Roll and bar. Roll types come in pairs. Bars are made in the shape of the strip at the mounting point. Both types are mounted on screws for adjustment.

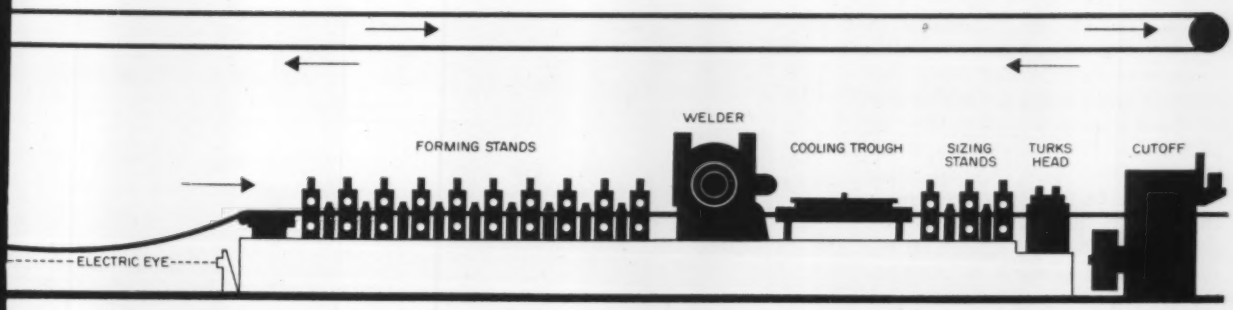
Idler rolls can do some of the forming. In most cases, only one or two pairs is needed. They are normally arranged at right angles to the main rolls and are adjusted in a horizontal plane only.

A straightener is mounted on a universal base so that it can be twisted to any angle to compensate

Auxiliary equipment like welders, flying presses, turks heads, idler rolls, and shears greatly extend the versatility of cold roll formers. This one has idlers at the exit which form this curve

Yoder Co., Cleveland





Blanc (Mich.) plant, it's an outstanding example of how easily cold roll formers fit into modern automation schemes

for twist in the shape. You usually have to warn operators to use them for guides only; they aren't a cure-all for poor roll setups.

Since guides are friction devices, they must be made from metals that wear well and reduce friction. Choose bronze for stainless steel strip and steel for brass strip.

ROLL DESIGN

According to Richard T. Angel, senior tool engineer, Pilotless Aircraft Division, Boeing Airplane Co., Seattle, (*Machine Design*, Dec. 13, 1956), you will have to process at least 50,000 ft of strip annually to justify the cost of tooling. The exception is short runs: Tools made of Kirksite, cast metals and plastics can be used for soft metals like aluminum or brass.

The kind of metal you're going to form and the shape you want determine the number of passes needed. The galling characteristics of a metal affect steel rolls and their hardness. They're sometimes plated to avoid the problem.

It's generally true that the harder the metal the more passes you need to avoid cracks at the radiuses.

Blank—The first step is a cross-sectional drawing of the shape. From it, you determine the developed width of the strip.

The next step is to estimate the number of passes you'll need. There are several ways to do it. You can compare your roll form layout with a machined block faired from flat to the finished section. Or you can use the pitch line method popular with the Dahlstrom Machine Works, Chicago. You can cut and try, but those who do frequently find the method is wasteful. Many fabricators depend on equipment makers to produce a workable set of rolls.

With the machined block system, theoretically you can slice it into any number of sections, each one of which is a roll station—the more slices you have, the greater the length from flat to finished.

Mr. Angel of Boeing says that a longitudinal forming angle of 1 degree 25 minutes is a good guide for determining the number of passes. The number you will need to form a flat piece into a shape is equal to the height of the section or segment multiplied by the cotangent of 1 degree 25 minutes. This is the formula:

F equals 40.436 times H, where *F* is the forming length in inches and H is the section height in inches. The forming length you get, divided by the distance between the roll stations and raised to the next whole number, will give you the correct number of passes.

Line—With this method, horizontal and vertical guides are established. The horizontal is called the pitch line, the vertical the pass line.

The pitch line is placed at or near the lowest point of the shape. It extends from the first to the last roll pass and establishes the pitch diameters of the male top rolls and the female bottom rolls. The vertical pass line intersects the horizontal pitch line and partly indicates roll loading.

With this system, forming begins at the center (pitch line) and works toward the outside. It eliminates many rolling problems like the locking of beads near the edges

This strip is an example of the exceptional variety of cold roll formed shapes. Note the unequal embossments

which prevents deep forming at the center of the strip.

Layout—Another method of simplifying roll design is the flower or shadow graph. The outline of each pass is superimposed over the final shape. The resulting flower can be studied for evenness and distribution of forming at each pass. It is a rough layout of the roll passes necessary to complete the section.

Die Materials—Mild steel is good enough for small runs and simple shapes. Aircraft firms find laminated plastics or cast iron adequate for all passes but the final one, which should be made with steel rolls.

Most shapes require good die steel rolls hardened to Rockwell C 60. If you're going to use unpickled, hot-rolled steel strip, rolls must be made of high-chrome, high-carbon steel. There are some cases where a final chrome plating increases roll life and reduces the possibility of galling.

Dies wear out, but it is possible to regrind them several times before they're ready for scrap.

For thin stock, roll dies shouldn't require any lubrication if they're made correctly. In practice, it is sometimes simpler to lubricate. That is especially true of the thicker metals and the more complicated shapes.

One of the most popular lubricants is soluble oil. Occasionally, a heavier lubricant is used on the most severe forming. Lead oleate in a solvent is an example.

Mohawk Metal Forming & Tool Co., Dearborn, Mich.

Ease of setup is one of the factors which equipment buyers have to consider. This machine has interchangeable arbors and end supports. The maker says changing rolls takes no more than 5 minutes

AUXILIARIES

In addition to the idler rolls, guides and straighteners, there are many machines which can be mounted on, or in line with, the roll former. They include flying shears, saws and rotary cutoffs, piercing and forming dies, several types of welders, levelers, straighteners and edge conditioners.

One manufacturer of cored welding rods fills a tube with flux and hard surfacing metals as it is made on the roll former.

Flying shears have a blade which is shaped like the profile of the part. A flying saw is most commonly used to slice through tubes and deep drawn parts which would collapse under the impact of a flying shear. One plant tried a new scheme: Friction sawing. An ordinary cutoff saw blade is run in reverse. The result is a smooth, even cut, free of burrs.

What's Ahead—E. J. Vanderploeg, chief engineer, the Yoder Co., Cleveland, says heavy steel structurals may be roll formed some day. Instead of hot forming them from billets, large cold roll formers may make them from plates.

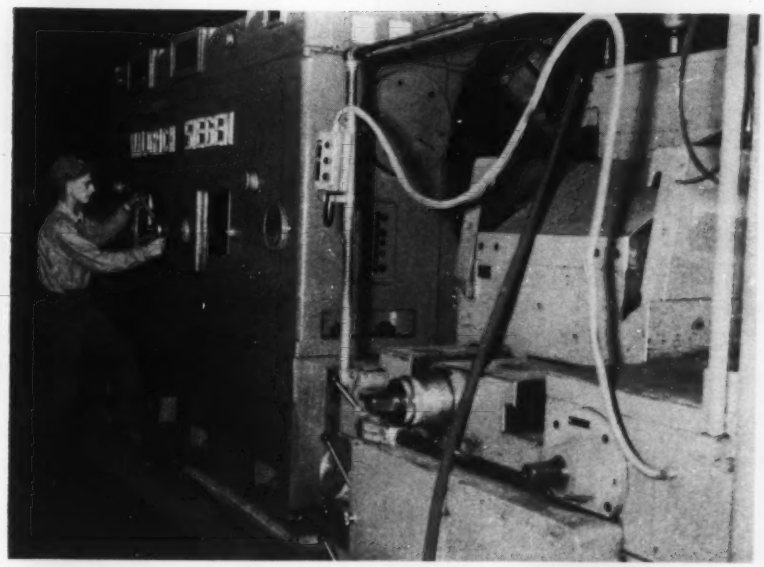
Modern office buildings are turning to the lightweight metal panel, assembled largely from sheets and shapes turned out by cold roll formers. There's room for a portable cold roll former that can make structural shapes and trim to fit the entire length or height of a building.

Airplane makers contribute heavily to the progress of cold roll forming by using newer metals and shapes. Stainless steels, titanium and magnesium present a challenge. Many metals must be worked while warm—titanium, for example, isn't ductile enough below 1000°F.

For such metals, the rolls are heated. It's done electrically with cartridge heaters or with induction equipment. Banks of infrared lamps are often used to heat magnesium strip.

Thoriated magnesium is one of the newest alloys for high temperature use in guided missile and supersonic aircraft. It's formed like ordinary magnesium except that extra precautions are taken to ventilate the working area. It's a standard safeguard against the mildly radioactive thorium.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



Operator turns the speed selector wheel on the headstock. The German-built machine will deliver 250 hp to the spindle

Lathe Boosts Roll Turning

Workpieces for this giant may be 63 in. in diameter, weigh 90 tons. The machine has cut rough turning time by as much as 75 per cent

ABOUT two years ago, two men met in Siegen, Germany, to talk about a problem.

John M. Dugan, manager of the roll division, Ohio Steel Foundry Co., Lima, O., wanted to rough machine steel and iron rolls faster and to better tolerances.

H. A. Waldrich, Siegen machine tool builder, thought he had some good ideas about a lathe that would do the job.

Result—Out of the meeting and discussions that followed came a heavy-duty lathe that will save Mr. Dugan's company thousands of machining hours and dollars every year.

The machine is packed with muscle to take the husky cuts Ohio Steel production men like. It delivers 250 hp to the spindle. Built to handle the company's biggest rolls, the lathe is 30 ft between centers and will swing a roll that's 63 in. in diameter.

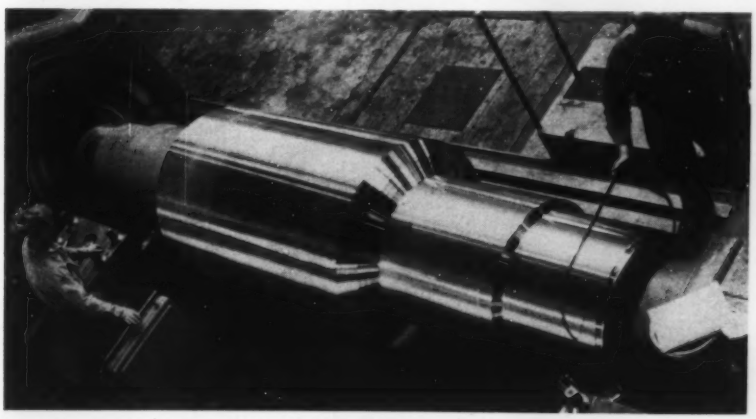
Case Study—The roll in the pictures has a 53 in. OD. It's 98 in. long. In the rough, it weighs about 57 tons. At least 12 tons come off in turnings alone.

Made from high-molybdenum alloy steel, the roll is about 27 Rockwell C. It takes 16½-hours to turn it on the Waldrich lathe. The same job used to take 68 hours.

Cutters — Special cutting tool bits are made up, one type for the journals and one for cutting the roll body (center portion). The shanks are 3¼ x 4 in. in cross section.

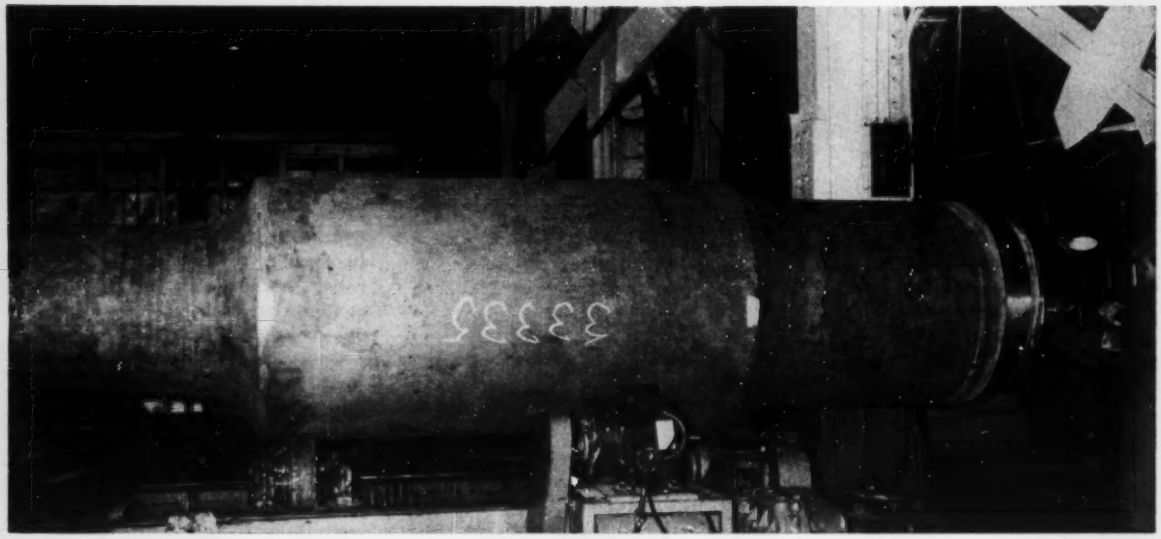
Body holders have 6 degree positive side rake, 25 degree negative nose rake and a 30 degree lead angle. Journal holders have 30 degree lead angle, 6 degree positive side rake, but a 1 degree negative nose rake to eliminate cratering and to change cutting pressures.

Two kinds of carbide are used in the tips. A grade 55-B Carboloy insert acts as the pad. It measures ⅝ x 1⅛ x 3 in. and has a 3/16-in. nose radius. A grade



Cutters operate from two independent carriages. A power wrench is used to open and close toolpost bolts. This roll loses 12 tons in rough turning

Two cutters with 3-in. carbide tips bite into the huge roll



Before the 57-ton roll goes into the lathe, it's centered on this machine. Supported on and driven by powered rollers, the roll is centered by the head at right

370 insert sits on the pad and does the cutting. It is the same size as the pad and is ground top and bottom. It costs about $27.

The tips are clamped to the shank. Before they go into the machine, the cutters are preheated to 350°F in a small electric furnace beside the lathe. Preheating prevents thermal cracking of the carbide when it enters the cut.

Cycle — Before the rolls are turned, they're centered on a separate machine. An overhead crane then lowers the roll into the lathe where it is mounted on centers between the face plate and the motorized tail stock.

Speed (in this case, 88 sfpm) is set at a selector wheel on the machine head. Feed is set at each of the two independent carriages.

About 15 in. of steel comes off the diameter of the cope end. It usually takes three passes. At the other end of the roll, a cutter takes off about 2½-in. in one pass. The center of the roll, the body, is roughed in one pass, taking off about 1¼-in.

Cutting is made more difficult by the hard seam caused by the parting line of the mold. This seam has to be removed.

Life—Operators now get about 3 hours of production for each tool grind; they get six to eight grinds per tool. Tool life is a compromise —production men are sure they could get longer use from a grind, but they set these limits to protect the $27 investment.

Bonus — The lathe operation turns in an added advantage that is only indirectly related to its ability to do the job. The old lathe produced splinter-shaped chips which were too fine to melt properly. They oxidized before they could be properly charged back in the furnace.

Chips from the Waldrich can be remelted. This saves about $15 for every ton of chips that can be re-used.

The lathe is the first, and largest, of three Waldrich's to be installed at Ohio Steel. One other is in production, and the third has just been installed.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Chips are picked up by an electromagnet. They can be remelted. Chips from old lathe had to be scrapped

Illustrated—New 9700 Series
Piggy Back Hydraulic Control Valve
Meets J.I.C. Standards

Look to Logan

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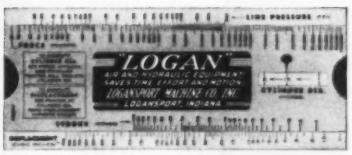

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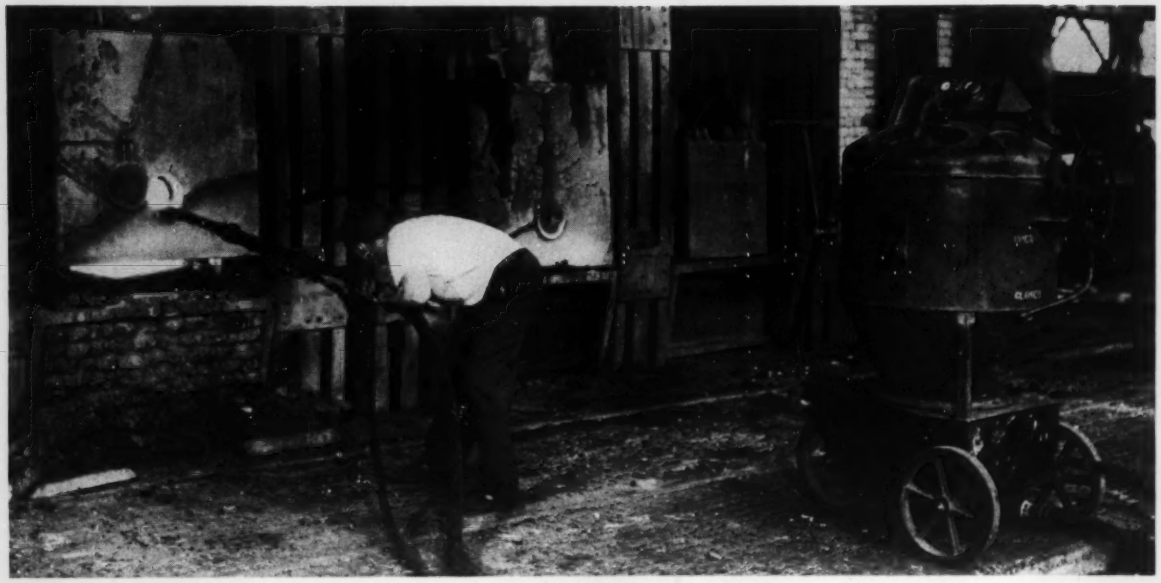

Shooting a patch on a backwall with a refractory gun. A recently developed gun can shoot a furnace during a heat

Maintaining the Open Hearth

Timely maintenance is a requisite for maximum production. Here's information on repairing breakouts, bottom damage, the tap and flush holes, roof and other superstructures

YOU can keep open hearth down time to a minimum by observing two simple—but often overlooked—rules:

1. Routine repair jobs become major projects unless they are attended to promptly.

2. Plan routine repairs to fit the operating schedule.

Ends—While the heat is tapping, the ends should be made up with dead-burned dolomite. This job can be done as quickly and usually better by shovel than with a dolomite machine.

As soon as work on the ends is finished, the charging machine should pull the door banks. Only with the door sills clear is it possible to do a good job of inspecting the bottom, banks and tap hole. With good timing, this procedure often can be completed by the time the furnace has finished tapping.

Tap Hole—As soon as the heat is out, the second helper should remove the runner and keep the tap hole clean while the furnace drains. Lance the hole down if it is too high in front and remove any build-up at the back.

If it is necessary to burn in a large patch on the banks, the tap hole should be closed, and, after the patch is burned in, the slag tapped out and the hole reclosed before charging.

Bottom—If the bottom is low, but clean and draining well, it should be dressed lightly with dead-burned dolomite, working from each end toward the tap hole.

If the bottom is high, use only enough raw dolomite to dry the wet spots. This prevents slag from collecting in front of the tap hole after it is closed and eliminates the primary cause of hard taps.

Wet Spots—If the bottom is rough and irregular with lime ridges which trap slag and steel, feel each wet spot with a bar. If

This article was adapted from Chapter 6 of the *First Helper's Manual*, written by Basic Inc., Cleveland, and published by the Dolomitic Refractories Association. Other chapters describe the open hearth plant, furnaces and raw materials, chemistry of the basic process and making a heat of steel. Copies are available ($3) from the Dolomitic Refractories Association, 1279 W. Third St., Cleveland 13, O.

BETTER POUR YOURS 'FORE SCOTTY GETS HERE OR THERE WON'T BE NONE LEFT.
THAT GUY'S GOT A GOOD SMELLER, HE COME ALL THE WAY FROM NUMBER FOURTEEN.
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HOOT MON!
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HUBBES

The Coffee Break

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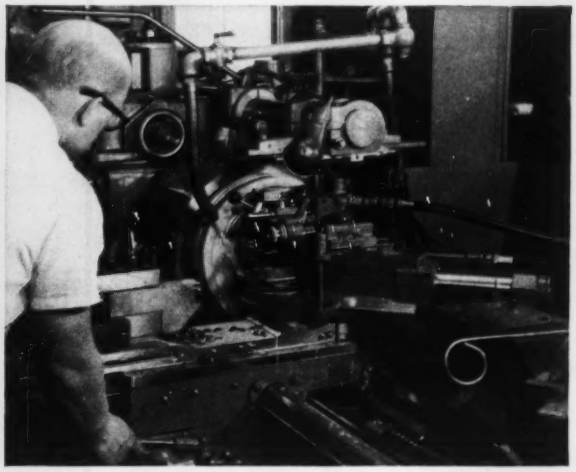

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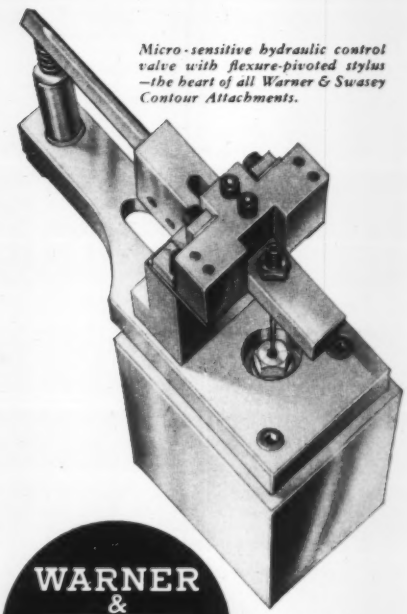

Micro-sensitive hydraulic control valve with flexure-pivoted stylus —the heart of all Warner & Swasey Contour Attachments.

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any of these puddles hides a hole or low spot, it should be blown or rabbled clean.

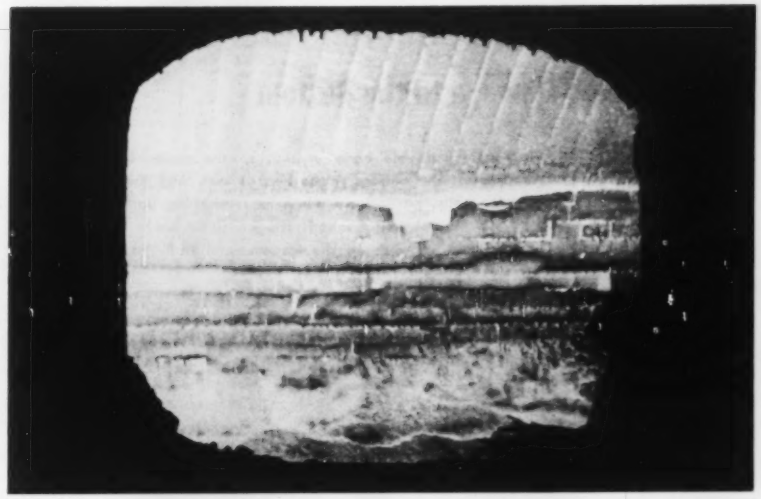
Although it would be a waste of time to knock down every lime ridge which traps a little slag, most large wet spots cover damaged areas in the hearth. Clean areas farthest from the tap hole first.

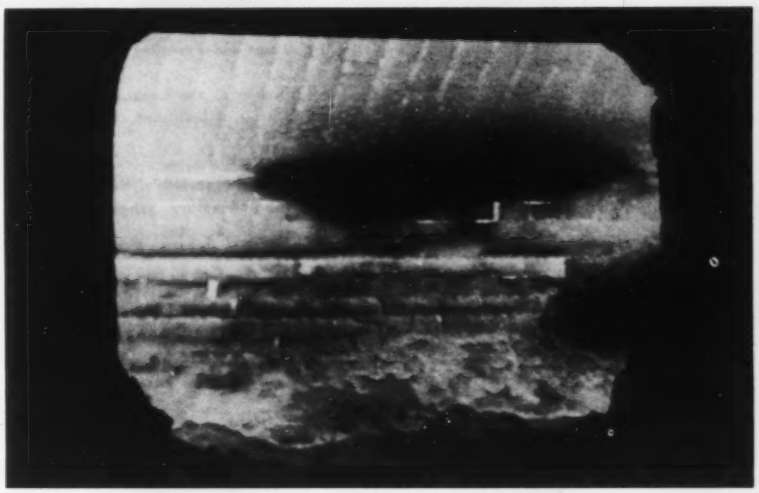
If there is an area or a hole in the middle of the bottom which is lower than the tap hole, burn down the tap hole. Blowing slag and steel out the tap hole should be attempted only as a last resort. If the furnace can be drained by a gutter burned along the bottom of an otherwise good tap hole, it is often possible to avoid piping the hole by filling the gutter with wet magnesia ramming mix.

Fill Holes—After removing steel and slag from any holes in the bottom, fill the deep ones with a magnesia ramming mix tempered with enough water to make it flow like wet concrete. Before the refractory has had a chance to set, push and pull it in place, using a bent pipe or rod to fill below overhanging edges.

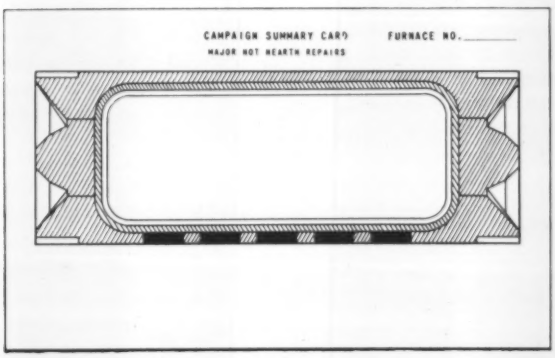
If the amount of refractory mixed is not sufficient to fill a hole completely, take the time to burn in enough dead-burned dolomite or magnesite to bring the repair to the level of the surrounding hearth. Dead-burned dolomite is then used to fill shallow holes and to dress up flat spots.

The furnace should be run until the patches of magnesia ramming mix are well colored. If the tap hole has not been closed, be sure to keep it clean during this period. Dress the entire bottom with dead-





Before and after views of skewback repair between furnace heats. At top is a section of the roof and skewback where a cut has started and two bricks have fallen out. At bottom is the patch put on with a refractory gun—it is black because the refractory hasn't reached the temperature of the surrounding brick. Patching time was 13 minutes 30 seconds. Temperature: 2150°F



A campaign summary card like this one lets you record and indicate the location of major hot hearth repairs during a campaign. When the furnace is shut down for rebuild, you will know if there are any chronic weak spots

FURNACE NO._____

REPAIR			MATERIAL USED		MELTER
DATE	LOCATION	DIMENSIONS	KIND	AMOUNT	

Preventing Damage to the Bottom

Learn to recognize bottom trouble early enough so the melter has time to tap the heat before a lot of the bottom or the heat is lost. Any first helper who watches his banks for boils, particularly when he is shaping up his heat and getting it ready to tap, is not going to get caught. If in doubt about a boil, put a rod or a bar—not a pipe—in the furnace and feel the bottom. Here are other precautions that will lessen hearth damage:

1. Since the flush slag contains more acid oxides than finishing slags, it is much more corrosive to the furnace banks. Keep the flush hole in shape and get all the slag off the heat that can possibly be flushed.

2. After the flush, when sufficient lime has risen from the bottom to form a slag that will hold the dolomite in place, make up the banks with dead-burned dolomite. Keep the ends built out and the front bank in shape so that it is possible to see all along the slag line.

3. Don't allow the metal to get too hot too soon. If the heat is high in carbon, keep feeding it lime and ore. Adjust the firing rate to compensate for the fact that such a heat will be in the furnace longer than one which melts close. Don't let it boil flat under a shiny slag.

4. Adjust the burners so the flame doesn't strike near the banks. By superheating the metal locally, a flame can start a boil that can tear away a big piece of bank.

5. After tapping, repairs should be made quickly and smoothly. Keep the bottom down and the banks no thicker than necessary. When heats ride high, you will be in trouble.

Good bottom maintenance pays large dividends. Keeping the furnace bottom in good shape will eliminate many problems and yield cleaner steel.

burned dolomite, making sure that each patch or repair has been covered. After burning in the dead-burned dolomite, clean out and close the tap hole.

If a fairly thick layer of magnesite or dolomite was applied at some spot, cover it with a little ground slag.

Banks—The backwall should be made up as soon as the bottom is finished. If the dolomite machine is used, place the refractory carefully and never use more than is needed. Heavy banks are dangerous because they are seldom burned in thoroughly.

Bailing too much dead-burned dolomite into the furnace causes the bath to ride on top of the banks where it is likely to start boils. Usually, heats riding on the banks lead to one sort of trouble or another from charge to tap. Except in the case of unusual trouble with front banks, fettle them with dead-burned dolomite after getting the first charge in the furnace.

Thin banks should be built up with successive, thin layers of dead-burned dolomite or magnesite burned solidly in place. Test the banks with a bar from time to time. If the repair is at all extensive, it may be necessary to mix some ground slag or mill scale with the refractory. Slag or scale is almost always required when using magnesite. When repairing a shallow hole rather than a deep one, use dead burned dolomite instead of a magnesia ramming mix.

Breakouts

If a breakout can be plugged with a piece of steel plate and basic brick without shutting the furnace down, the job is handled in the same way as the deep bottom hole repair. If the furnace must be cooled to repair the iron and the brickwork, get in the furnace and clean the steel and slag out of the hole.

Major Breakouts—After the pan is sealed with a steel plate and new brick laid, put 5 in. of properly moistened magnesia ramming mix into the hole. If the furnace is completely cold, use only 3 quarts of water to each 100 lb of ramming mix. If the bottom is still warm, use 3½ to 4 quarts of water.

Ram solidly with an air hammer. It should tamp down to about 3 in. Scratch this surface with a rake and make successive 5-in. applications until the hole is filled. When the furnace is hot again, dress the patch with dead-burned dolomite, burn this in place, give it a light slag wash and charge. This patch will be an integral part of the bottom and should give no further trouble.

Bottom Repairs

Keep records of all bottom repairs which cause abnormal delays, and when a furnace is shut down for a rebuild, you will know if there are any chronic weak spots in the hearth.

Replace—These areas should be dug out and replaced with magnesia ramming mix. Carefully ram it into place following the procedure for breakouts.

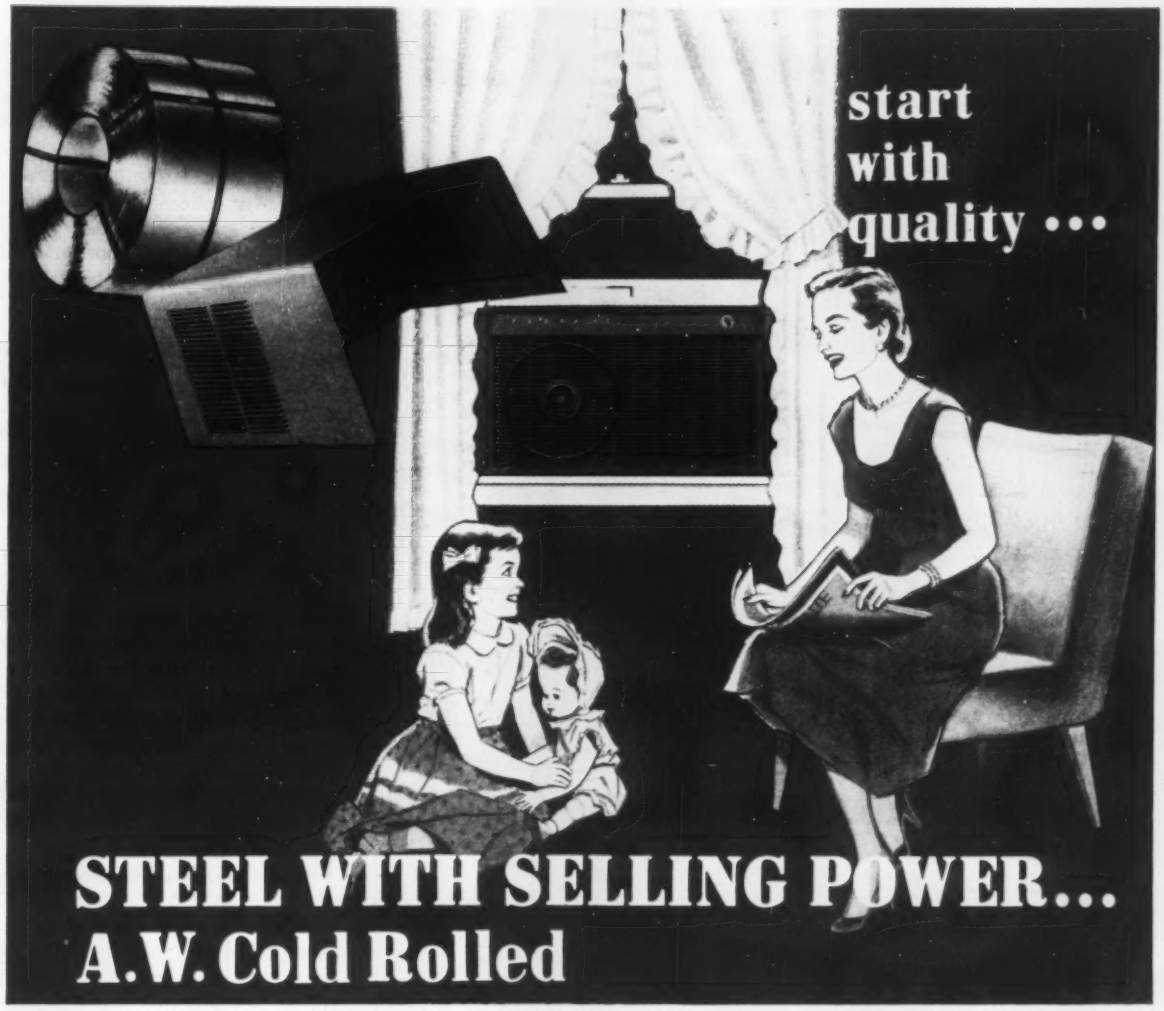
It is good practice to blow or wash down the bottom and banks and resurface them with quick-setting grain magnesite just before shutting down for a rebuild. Or after shutdown, resurface cold with magnesia ramming mix rammed over the hearth.

Renew—Whole banks, ends, tap hole sections and large portions of the bottom may be renewed during a shutdown by ramming in magnesia ramming mix. Many shops have found this to be the best way to get furnace bottoms in top condition for new campaigns.

Some such repair can profitably be made to a furnace each time it is shut down for a rebuild. When this type repair is extensive, it may require forms and special equipment.

Tap Hole

After a furnace is tapped, run it hot enough to drain well and to



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BOLTS

PROGRESS . . .

prevent steel and slag from freezing in the hole. When the runner spout has been removed, some of the clay used to pack the joint often sticks to the back of the hole and acts like a dam. This must be removed at once with a bar, a scraper or an oxygen lance. Good drainage is highly important. If the tap hole seems to be a little high, burn it down right away.

Clean Out—If the furnace is kept hot, it will drain until the bottom is dried with dead-burned or raw dolomite. Eventually, the second helper must dry and patch the tap hole, but he must wait until the bottom is dried. After this is done (working from the ends to the tap hole), shut off the fuel and throw a shovelful of raw dolomite into the hole.

The second helper can then throw a couple of shovelfuls of raw dolomite into the hole from the back of the furnace and immediately rake out all of this together with the adhering slag. This procedure will keep the tap hole low and clean on the bottom. It also will help to prevent a hard tap on the next heat.

Packing—After the second helper has cleaned out the hole thoroughly, he should push some raw dolomite to the mouth of the tap hole from the back so the first helper can face off the hole from the front of the furnace with several shovelfuls of dead-burned dolomite or magnesite. The second helper should then pack the hole solidly with raw dolomite and insert a fireclay plug 4 to 6 in. thick back of the tap hole.

Depending on the furnace design and the type of steel made, various mixtures of raw dolomite and dead-burned dolomite, or dead-burned dolomite and coal, or all three can be used. This is a matter of shop preference.

Piping—A good job of piping the tap hole depends on filling the space around the pipe solidly, leaving no voids. Use a moistened magnesia ramming mix to build up the bottom of the hole to the proper level. Place the pipe on this and fill the space around the pipe with more wet ramming mix. Shovel it in and pack it tightly in place.

Remove any refractory which

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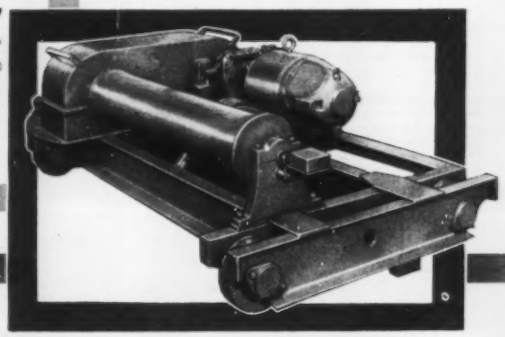

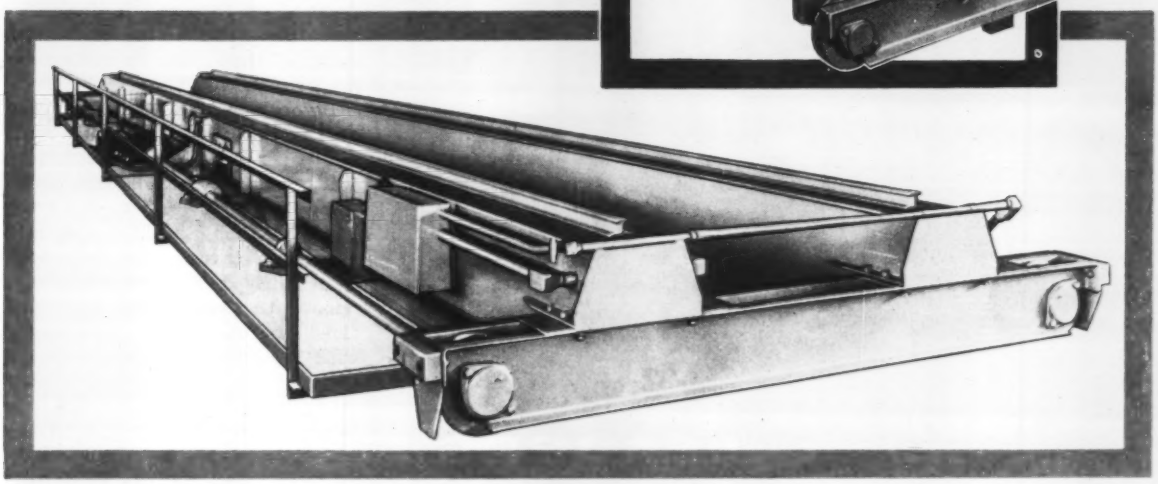

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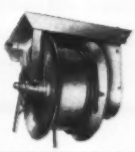

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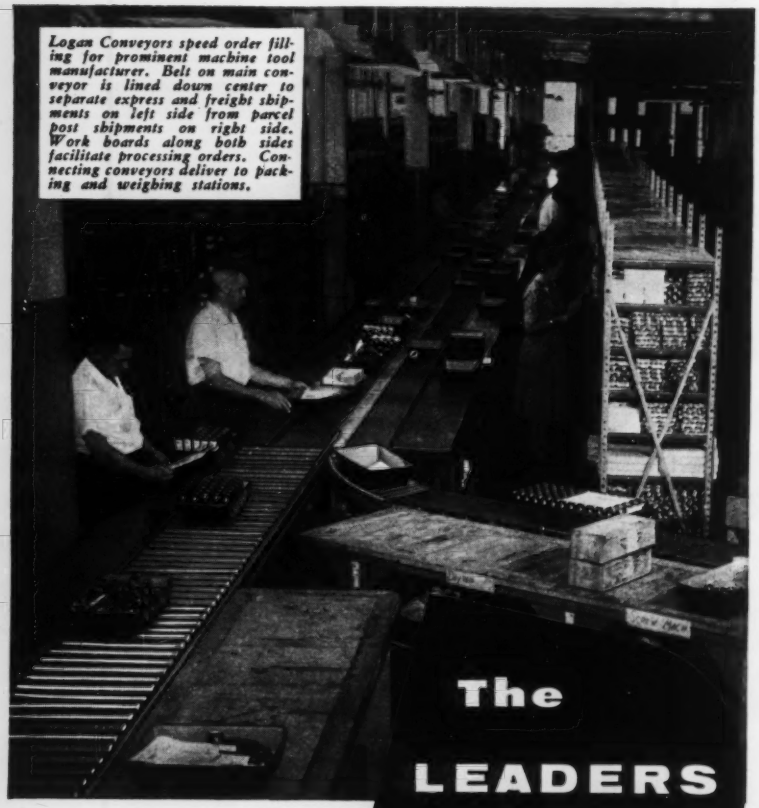

Logan Conveyors speed order filling for prominent machine tool manufacturer. Belt on main conveyor is lined down center to separate express and freight shipments on left side from parcel post shipments on right side. Work boards along both sides facilitate processing orders. Connecting conveyors deliver to packing and weighing stations.

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A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Logan Conveyors

PROGRESS . . .

falls in front of the pipe on the furnace bottom before it sticks there. A 1¼-in. pipe, flattened and bent at the end, makes a good tool to shape and pack the back of the hole. Use a rabble to ram the refractory in place around the front.

With Gun—A pneumatic refractory gun does a good job of piping the hole almost entirely from the front of the furnace. It eliminates much shoveling and provides assurance that the refractory is properly packed.

Before shooting, plug the space around the back of the pipe with wet paper bags, backed with several bricks, so that you have something to shoot against. Load the gun with a magnesia ramming mix or basic gun refractory and shoot it in fairly wet. After shooting, remove the bricks and bags and finish the back of the hole neatly with the same refractory.

Tap holes blow because molten steel, leaking through the tap hole facing, comes in contact with the materials used to close them. Some of these release large volumes of gas when they are heated. The bigger the tap hole, the harder it is to form a substantial crust over the front end being faced off and the greater is the likelihood that steel will leak through it.

Precautions: Keep the walls and bottoms of the hole clean and patch any irregularities with a magnesia ramming mix. When the hole is small in front, it can often be lined without a pipe, using a paddle, but don't put off piping a hole when it really needs it.

First Job—Pipe the tap hole as soon as the bottom is dry and before starting other bottom repairs. In this way, you will burn in the new tap hole while you are burning in a bottom patch. Sometimes this is not practical, and it may be necessary to wait until other bottom maintenance has been completed.

Cleaning off the tap hole casting and making up and setting the runner should be done as soon as possible so the second helper will have time to do the rest of his work before the heat is melted. The runner must line up correctly with the hole, be set firmly and

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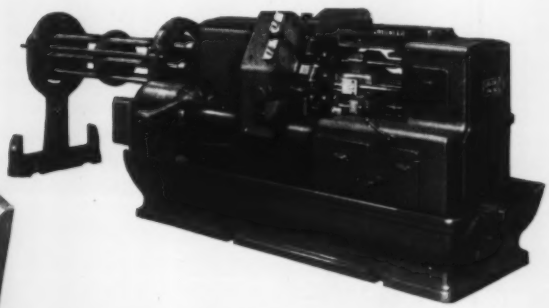

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World's Largest Die

MILLED EASILY, ACCURATELY ON A P&W KELLER MACHINE . . . Consisting of two halves, each weighing 30 tons, this is the world's largest closed die block. Designed to forge aluminum backbones of fuselage and wing structures for the new multi-jet Martin SeaMaster, this giant die was produced by "Kellering" at the U. S. Air Force Heavy Press Plant operated by Aluminum Company of America.

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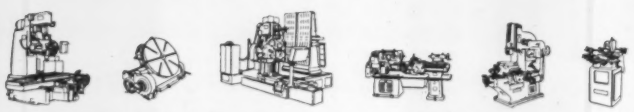

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MACHINE TOOLS • GAGES • CUTTING TOOLS

be entirely clean. Fireclay surfacing should be smooth.

Flush Hole

Care of the flush hole begins when you are getting ready to tap. Just before the tap hole is opened, clean out the flush hole, look through a wicket and see how far above the bath the hole lies. If it is 2 or 3 in. over the bath at tapping time and large enough to permit a rapid runoff, you don't have much to do to it. This inspection indicates whether you will have to burn the hole down or, perhaps, raise it.

Fill—After inspecting, forget the flush hole until after you charge. Then clean out any dead-burned dolomite that accumulated in it when you made backwall, and raise it by using a magnesia ramming mix or lower it with a lance. Fill it with a mixture of powdered coal and dead-burned dolomite.

When you have finished flushing, face it off with the same mixture. If it is closed tightly, your heat can foam, you can add ore, stone or anything else and still know it will be easy to open. A flush hole can be fouled up only if slag or metal gets into it by a blowup of lime or bottom and when additions which agitate the bath are made to the heat. Keep it closed tightly.

Superstructures

Backwalls and skewbacks can be maintained with a refractory gun, or refractories may be shoveled on the back between heats. Such maintenance will improve roof life.

Critical Times—There is little more you can do for your roof except to avoid overheating. Whether or not you have automatic roof temperature control, the roof must be watched carefully. It is most likely to be damaged:

1. When sintering a new bottom.
2. About the time you are ready for hot metal.
3. When your heat is foaming.
4. When boiling lime with a heavy slag.
5. Any time the bath is dead and without action.
6. When finishing a flat, low carbon heat.
7. After tapping, when the furnace is empty.

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The heart of any central hydraulic system is the pump. And if the pump is an Aldrich you can be sure of 100% availability of hydraulic power, with either oil or water.

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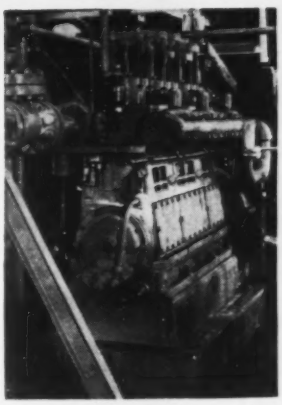
For your tough pumping problems, it pays to specify Aldrich. Write today for a copy of Data Sheet 100, a condensed catalog and selection chart covering our entire line. The Aldrich Pump Company, 18 Pine Street, Allentown, Pa.



Four 5'' stroke Aldrich Direct Flow Pumps on die casting service in a midwestern metalworking plant. These pumps are handling 250 gpm at 1500 psi.

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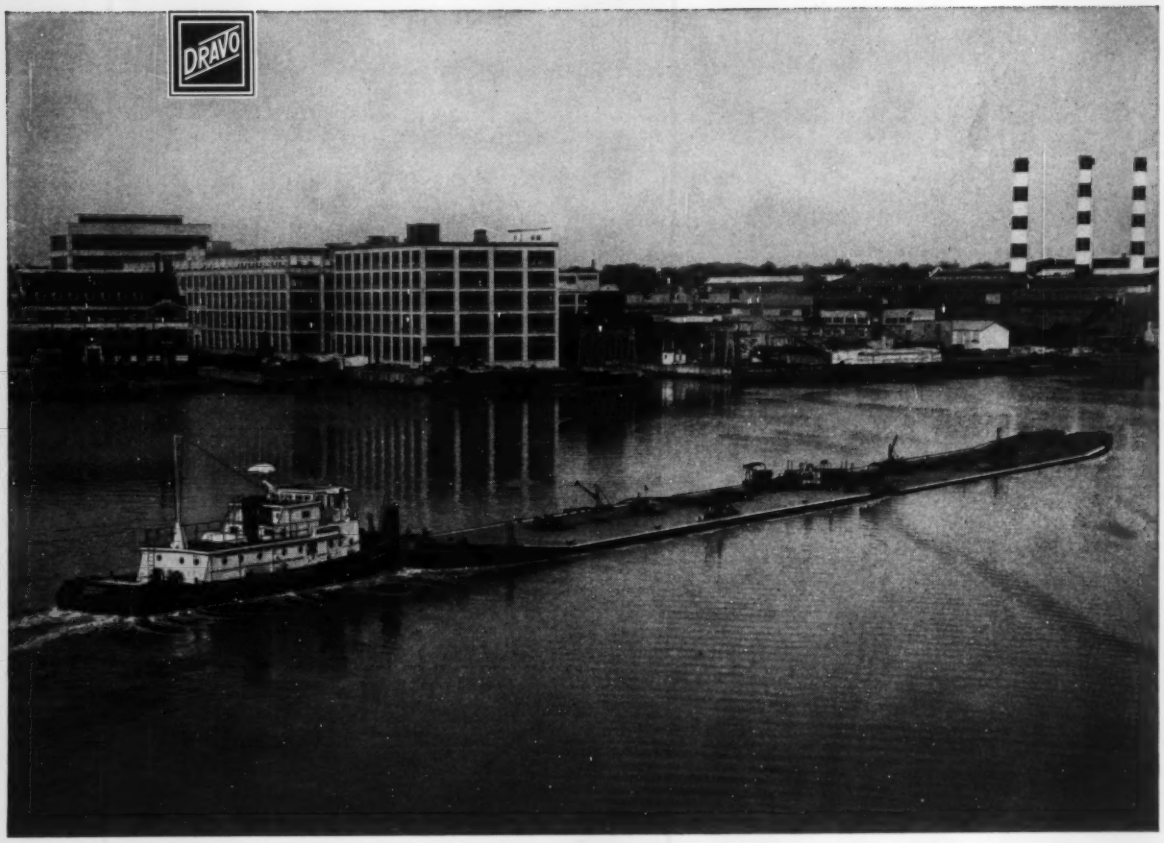

Unique "PUSH-PULL" boat hauls twice as much oil . . . FASTER

East coast barge transportation presents unusual problems. Routes traverse both open and sheltered sections of the intracoastal waterways. Steuart Petroleum, an oil products marketing company operating in this area, needed to reduce round-trip time and increase the amount of tonnage hauled.

Dravo engineers provided the answer with two integrated tank barges and an unusual combination harbor tug and river towboat, the "Papa Guy." This versatile boat is equipped to pull the specially designed barges on a hawser or push them. Because "push towing" is more efficient, hawser towing is used only during heavy weather in exposed waters. Results? On normal runs, round-trip time has been cut 25% and tonnage per trip doubled.

Dravo shipyards have launched more than 3,700 hulls, providing a solid background for solving marine equipment problems. For information on barges, towboats, or any of the products and services listed below, write DRAVO CORPORATION, PITTSBURGH 25, PA.

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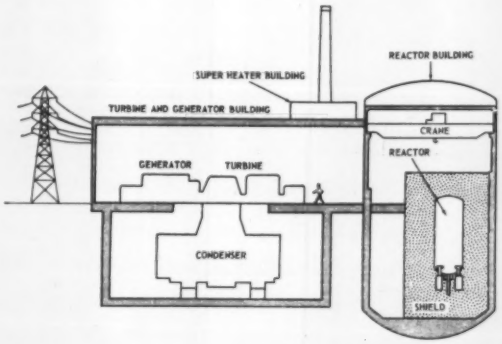
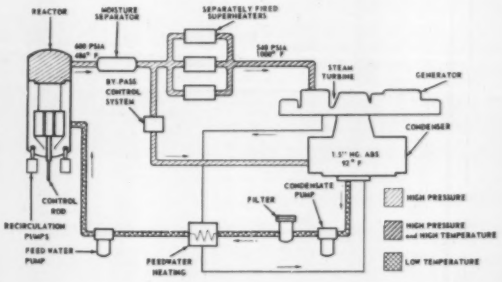


Layout of reactor, superheater and turbine-generator buildings



Controlled recirculation boiling water reactor system for Northern States Power Co.

Nuclear Power Takes Another Step

Midwest utility group will build 60,000-kw facility—the 19th reactor-powered generating plant now planned for the U.S. Their capacities total 1½-million kw

PLANS for another nuclear powered generating plant have been announced. Financed by a group of midwest electric utility companies, the project calls for a 60,000-kw plant to be completed by 1962 at an estimated $20 million to $25 million.

Northern States Power Co., Minneapolis, will own and operate it. The site, still to be selected, will be someplace along its system. Energy produced will be piped to participating utilities in Iowa, Minnesota, Missouri, North and South Dakota and Wisconsin.

U.S. Total—This brings to 19 the number of atomic plants in the planning stage. Estimated cost is $675 million. Total generating capacity will be nearly 1½-million kw.

Three plants are scheduled to be in operation this year and the rest by 1962. More than 60 utility companies have united to build and operate ten of them.

Reactor — Allis-Chalmers Mfg. Co., Milwaukee, will build the reactor—a controlled recirculation boiling reactor (CRBR). The outstanding feature of this type is its high energy output per unit volume.

The cylindrical core, measuring 5 x 5 ft, will generate as much heat (133 megawatts) as a boiler burning about 20 tons of coal an hour continuously. This is possible because of the large volume of water being recirculated through the reactor.

A boiling water reactor is the power source for the 5000-kw power plant in full operation at Argonne National Laboratory near Chicago. (See STEEL, Feb. 11, p. 122.)

Pressure—The CRBR will operate at 600 psi. Heat from the nuclear reaction will boil water to produce saturated steam at 488°F. The steam will flow through superheaters directly to the turbine. Fired with conventional fuel, superheaters will increase the temperature of the steam to 1000°F at 540 psi.

The reactor vessel will be 9 ft in diameter and 23 ft high. It will be housed in a steel and concrete building about 45 ft in diameter and 70 ft high. The steam turbine-generator unit will be housed in a conventional building.

Safety—Boiling water reactors have a high degree of inherent safety. The water within the reactor core is essential to keep the nuclear chain reaction going. Any excess heat generated by fission causes an increase in the amount of steam within the reactor, displacing the water and causing the reaction to slow down.

The reactor power will be adjusted by controlling the rate of water recirculation. This is done by large pumps at the bottom of the reactor.

Separator—The water will carry along the steam produced by the heat, and the steam bubbles will be separated by centrifugal devices. After the energy in the steam has been used at the turbine-generator unit, the exhaust steam is condensed and returned to the reactor to be used again.

If greater steam output is required from the reactor, the speed of the recirculation pumps will be increased by automatic control. This will force out additional steam from the reactor core, causing the power to increase.

If power demand decreases, the pumps will slow down, reducing the quantity of steam removed from the reactor core, slowing down the reaction rate.

Expansion in Erie

New equipment and construction signal a modernization program for Erie Forge & Steel Corp.

ERIE FORGE & Steel Corp., Erie, Pa., recently announced the ordering of a 75-ton Lectromelt electric furnace. Emil H. Lang, president, says this is only the beginning.

The company has been producing steel castings, forging ingots and heavy forgings for 85 years. (It's best known for its big forgings in steam turbine rotors, diesel crankshafts and marine propulsion shafts, including the shafts on the *U.S.S. United States.*) Now Erie is modernizing.

Capital—The company has been publicly owned only since 1950. The new attitude is beginning to be felt in broadened stock ownership, especially in the Erie area.

The nine-month period ended Jan. 1 saw a 69 per cent increase in sales over the previous full year. Erie has a $12-million order backlog. Earmarked for expansion is $4 million, maybe more. Erie has a certificate of necessity.

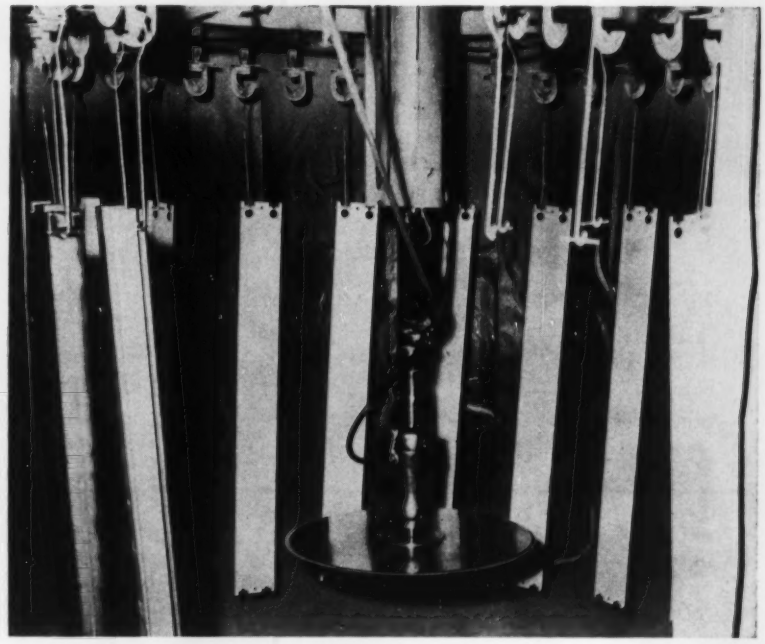
Management — Mr. Lang has been with the company 54 years. He's been bringing new faces into both middle and top management. They join a hard core of production men who have built the company's reputation for quality.

Equipment — The acid open hearth and foundry needs relocation (an unrelated manufacturing plant lies between it and the main works). Plans are to build a new 200 x 700 ft foundry adjacent to the main works. The future of the two 100-ton basic open hearths in the main plant is still in question.

A second 3000-ton forging press is in the expansion picture, as are more heat treating facilities. A second 75-ton electric furnace and a 15-ton electric are scheduled for a second expansion round.

Research—Erie is continuing a quality improvement program with Battelle Memorial Institute, Columbus, O. Research and development activities will be expanded to keep pace with the new look.

Installation of vacuum casting equipment is being seriously considered, but will probably not come in the first expansion, planned for completion in about two years.



Parts of various sizes and shapes are painted electrostatically as the conveyor makes a circular loop around the reciprocating disc

Reducing Painting Costs

ELECTROSTATIC painting isn't limited to the big plant. A little one is finding that it helps keep manufacturing costs in line.

Melrose Lighting Co., Philadelphia, produces industrial and commercial fluorescent lighting fixtures. It has only 25 employees, but it turns out a lot of fixtures in a year.

Parts—Reflectors, louvers, irregularly shaped ends and several other parts are painted electrostatically. A few larger parts are hand sprayed in a water-wash booth, and one hand touch-up is required on louvers.

Parts such as reflectors (13 x 48 in.) are hung individually on a workholder; some of the smaller parts, such as fixture ends, are grouped on workholders.

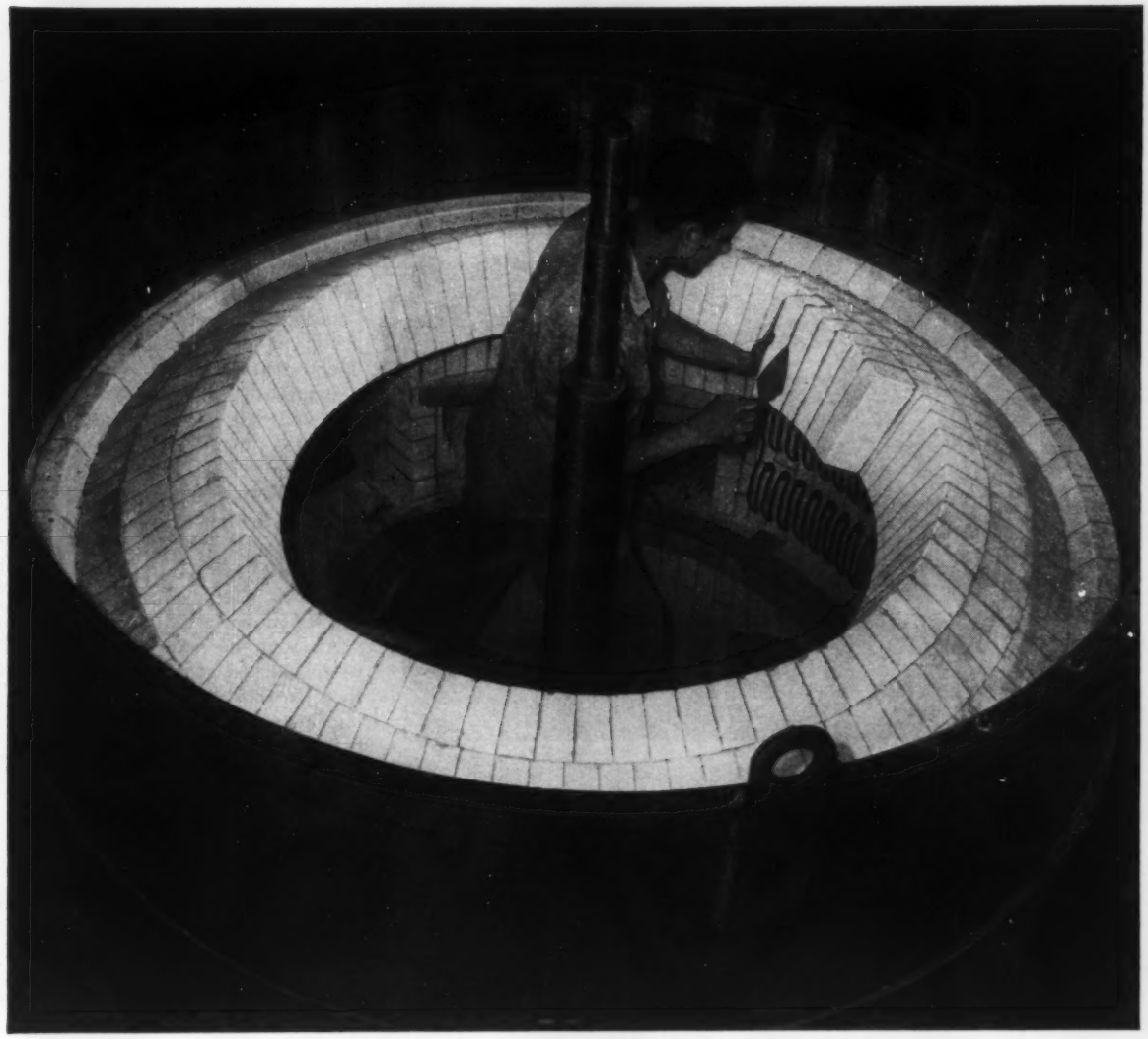
Manpower — Melrose did use three men to hand spray the parts. The company still has three painters, but only about one-fourth of their time is spent in the spray booth. When they're not needed for hand spraying, they do other work.

Two men could hand spray 70 louvers an hour. The Ransburg No. 2 Process Electro-Spray paints over 200 an hour. The two men touch up the recessed areas.

End Parts—Production on the fixture end parts jumped 400 per cent. The ends were hand sprayed 12 to a rack. They were painted on one side, turned and painted on the other. Production: 400 an hour.

The reciprocating disc averages 2000 a day. Quality of the work is improved, too. Parts are hung six to a workholder on 18 in. centers. As they pass around the reciprocating disc in the 8-ft conveyor loop, an indexer in the loop center turns the workholder, and both sides are coated in one operation.

Finish Line—Speed of the 281-ft conveyor is 5 to 14 fpm, depending on the parts being painted. After parts are coated, they pass into an oven where they bake out at 300°F. Again, depending on the conveyor speed, baking time takes 5 to 11 minutes.



Perfect fit of taper-cut brick results in strong, heat-tight furnace dome.

How "tailor-made" domes cut construction costs

Armstrong "tailor-made" domes lay up fast and true—can cut bricklaying time and costs by as much as 25%. Markings on each brick, each course, and each carton do away with mistakes and confusion on the job.

Each dome is individually cut to your exact furnace measurements. Every brick in an Armstrong dome is precision tapered for non-slip keying fit. This perfect fit gives domes a structural stability impossible to obtain with standard and wedge brick. And you pay less in the final analysis for an Armstrong "tailor-made" dome than for one made with standard shapes. The slight extra brick cost is more than made up by the saving in bricklaying time and the long low-cost refractory performance you get with strong, efficient Armstrong domes.

A free booklet gives you details on "tailor-made" domes and the complete line of Armstrong Insulating Refractories. Write Armstrong Cork Company, 2703 Reed Avenue, Lancaster, Pennsylvania.

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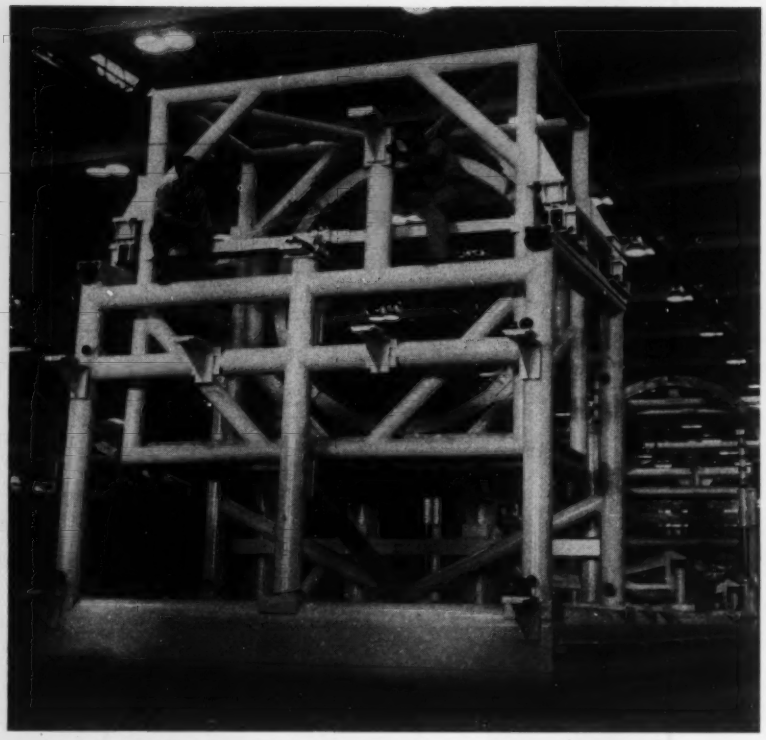

Size becomes a big production factor in this . . .

Tooling for Big Jets

As aircraft get larger, so does the tooling that's used to make them. These assembly fixtures are good examples. Here's how they were handled for the jet tanker

MASSIVENESS and accuracy—the aircraft industry must build its tools around these requirements. Now in production at Ryan Aeronautical Co., San Diego, Calif., huge, close-tolerance jigs and fixtures control assembly of fuselage sections for Boeing's KC-135 jet tanker.

The largest is a mating jig that is 14 by 17 by 57 ft. It's built in two sections, according to Boeing instructions, so it can be shipped on a flatcar if necessary.

Precision—The huge upper and lower lobes of the midfuselage must be located in this fixture into relative position within 0.010 in.

Both headers on this fixture must be retracted each time the sections are lowered into the jig. They must then return to their original position. Despite this repeated movement, rigid accuracy has to be maintained.

Rigidity—To get this "beef" in the tools, Ryan engineers used two 12-in. iron pipes, one on top of the other, for the base. They're strutted together by welded ¼-in. steel webs. These structures were put outdoors to sun cure and gain dimensional stability.

Accuracy within the fixture was achieved with optical tooling. Alignment telescopes established lines of sight to serve as reference points. Two or more lines established through the fixture were used as references in placing formers and locators.

Distance down the line of sight was measured with a 20-ft micrometer. An optical micrometer also helped make the accurate measurements.

Handicap—Initial design of the tooling was hampered by the fact that ideas had to be based on the prototype "707" commercial airliner rather than on engineering drawings of the military version. Well-educated guesses had to be projected toward the specific engineering details.

Two Ryan production engineers went to Boeing's Seattle plant to keep in touch with design progress on the aircraft. Looking over the designers' shoulders, they shot information back to San Diego.

As soon as tool design prints were finished, the designer took them to tool manufacturing, making himself available for a conference with the toolmaker to get the necessary work under way immediately.

Talent Swap—To make up for a local scarcity of some special skills, four other aircraft plants loaned Ryan 120 designers, engineers and jig and fixture builders. These shock troops from Boeing's Seattle and Wichita, Kans., plants, Lockheed's Marietta, Ga., factory and the Jonco Aircraft Co., Shawnee, Okla., are credited with helping to put Ryan over the hump in the tooling project.

Alterations — In a big aircraft-project, constant engineering changes are the rule. Ryan established a group within the production engineering department to analyze change instructions and to put them into effect. In the early stages of the KC-135 job, more changes came through on the aft fuselage than the total number of parts in the section.

Usually, this control group was able to make the change effective on the first subsequent part turned out. Any necessary rework brought about by design changes was handled by a special group on the production floor, consisting of production personnel, a manufacturing engineer and inspection and production representatives.

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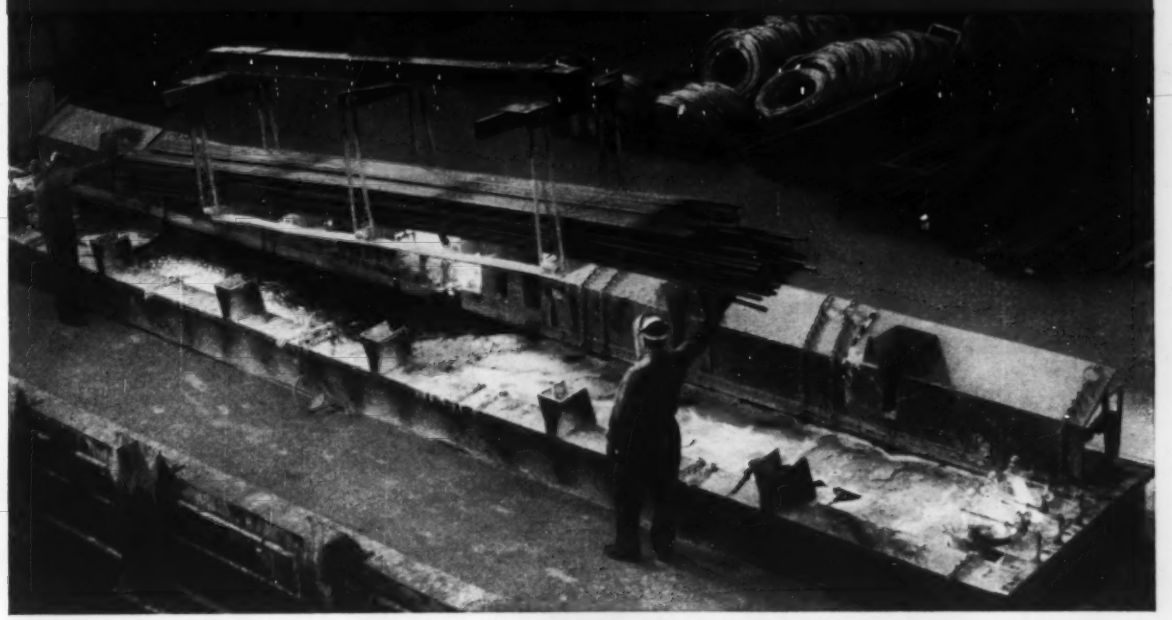

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Recently, a large supplier of nickel-plated parts was faced with the problem of doubling his production to meet the increased demands of his customers. There was no additional floor space for extra tanks or equipment.

The solution to the problem was Udylite's Hi-C Bright Nickel Process. By simply changing his 13,000 gallons of bright nickel solution to the new Udylite Hi-C Bright Nickel, the increased production was obtained.

Current densities were increased as the greater conductivity of the high chloride solution permitted higher current with no burning, even without increased agitation.

In addition, this user of Udylite Hi-C Bright Nickel Process benefited by better throwing power, which meant less nickel was used to obtain thickness requirements in recesses. Also, fewer anodes were needed since the Hi-C process provided the best anode corrosion of any nickel bath.

Why not find out what Udylite's exclusive Hi-C Bright Nickel Process can do for you? Write today for a new free folder describing Hi-C Processes for rack and barrel plating—or call your nearby Udylite representative.

THE Udylite CORPORATION DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

Sealing Porosity In Metal Castings

You can't salvage a poor job by impregnation, but it will let you use aluminum sand castings for pressure work

By MARVIN SCHNEIDER
and
HENRY SIESEL
Applied Engineering Associates
Brooklyn, N. Y.

POROSITY is one of the difficulties encountered in the use of aluminum and magnesium castings. They have many thousands of pinhole gas inclusions and shrinkage cavities.

As in a sponge, the pinholes form somewhat of a continuous structure and allow fluids and gases under pressure to pass through the cast part.

Crankcases — Because of this, aluminum crankcases on two-cycle engines give a great deal of trouble. Compression causes oil and vapor leaks directly through the casting.

The same trouble occurs with aluminum alloy pistons used in high compression engines. The problem is one of pressure sealing the casting.

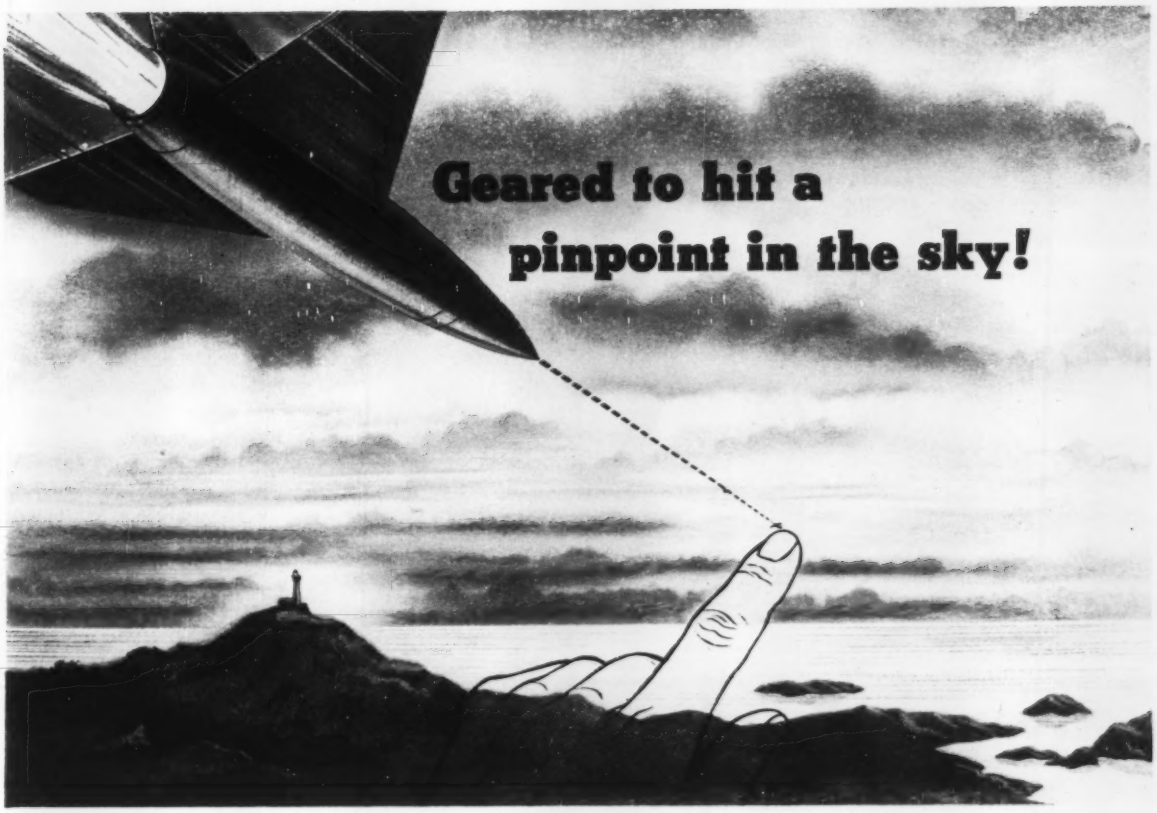
Hydrogen—In this instance, hydrogen is the principal gas causing trouble when melting aluminum and its alloys. It dissolves in aluminum probably as atomic hydrogen, or as a hydride containing 1 atom of hydrogen.

When the aluminum solidifies, hydrogen is precipitated in the form of small bubbles which are entrapped.

Microshrinkage — The second major cause of porosity is microshrinkage. As the metal crystallizes from the melt, large grains are formed throughout the mass. These lattices interlace during solidification of the melt to form the solid casting.

Even though the grains may be close packed at the solidification temperature, they will separate on cooling and leave voids along the grain boundaries.

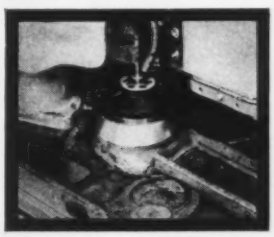
Corrosion — These voids cause the most serious type of metal corrosion along the grain boundaries. The casting loses its cohesive power



Research and development are constantly extending the range and speed of modern military aircraft and missiles, making higher and higher demands on counter-measures as well.

In designing counter-measure controls to the high degree of accuracy required for our air defense, engineers are specifying gears of greater and greater precision and gear trains whose combined errors are almost infinitesimal. In many plants, gears which meet these specifications are being turned out on *standard* Fellows equipment at a high rate of production.*

To combine extreme accuracy with high production rates, look to the complete Precision Line of Fellows gear production equipment. Fellows Gear Shapers are available in a full range of capacities from 1/16″ to 120″ P. D. Write, wire, or phone any Fellows office.



*For example, Hughes Aircraft makes up to 15,000 fine pitch gears per month with tooth-to-tooth composite error as small as 0.0003″...on standard Fellows equipment.

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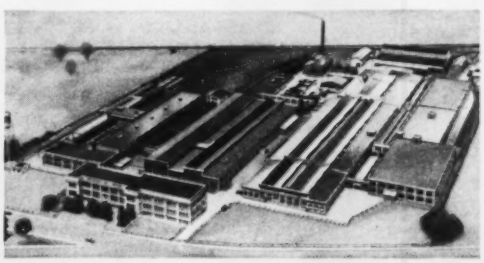

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SEALING POROSITY . . .

(tensile strength) at the affected section and will fail under stress.

It is almost impossible to prevent microshrinkage. It can be somewhat alleviated by casting at as low a temperature as possible. An alloy of eutectic composition can be used, or the metal may be poured while it is in a semiliquid state.

Impregnation — The purpose of vacuum impregnation is only to seal microporosities. You cannot remedy a relatively large structural defect by this process.

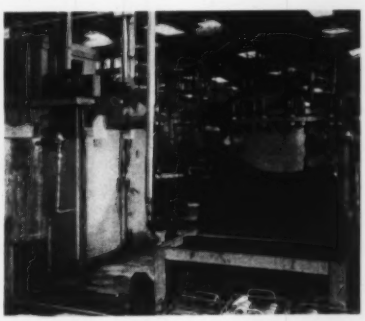
You must start with clean castings. First, a water detergent wash is used to remove all surface dirt. Then the castings are pickled to dissolve the oxides. Water is used to wash away the dilute acid.

Dried—Castings are oven dried for two reasons: To evaporate the moisture, to minimize evacuation difficulties and to allow the impregnant to readily penetrate the porous structure. The castings are allowed to cool to handling temperature and put in the impregnator.

Smaller castings are usually put in baskets and handled in a batch. Large castings must be handled individually.

Impregnating—The castings are lowered into the impregnator, and the unit is pressure sealed. The tank is evacuated to about 3 in. Mg psia by an eccentric rotor type vacuum pump. Vacuum must be held for 20 minutes to fully degas the castings. A condenser in the vacuum line dehumidifies the air and reduces the load on the pump.

The impregnant is sucked into the impregnator until the castings are covered. The vacuum is released and air pressure of 75 to 100 psi applied to force the impregnant into the casting. This



Part of impregnating setup shows baking oven (left), impregnator (right)

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High quality A. P. Green refractory products pay off in service with greater tonnages, smoother operation, and lower maintenance costs.

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For specific recommendations on your refractory problems, get in touch with your local A. P. Green distributor. He's listed in the yellow pages of your telephone directory.

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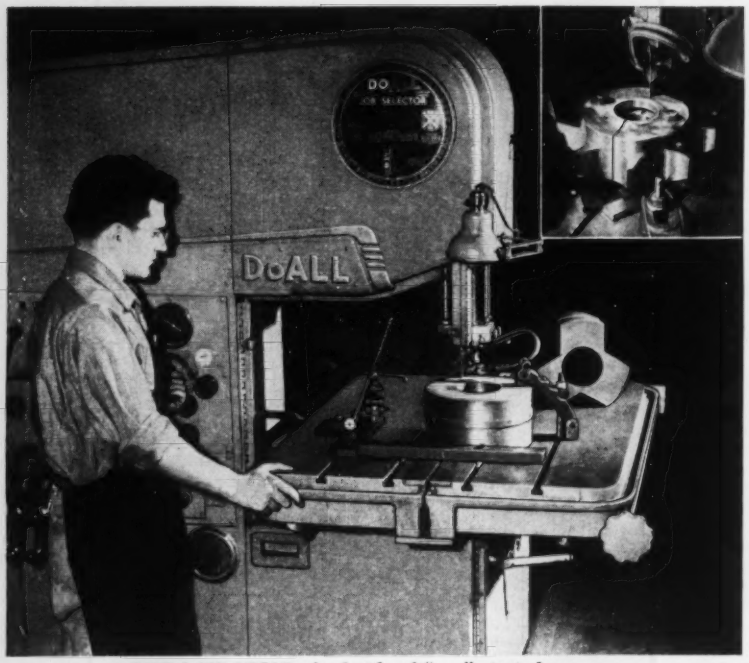


THE LOW PRICE of a bottle of "pop" starts here . . .

A New Look at "Tools"..

Pausing for a cold, tangy soft drink is an old American custom. You can still enjoy it at pennies-per-pause because of some remarkable new "tools" of production. For example, the high speed machines that fill and cap the "pop" bottles for a fraction of a cent each.

The machinist in the picture above is making parts for one of these machines. He's helping keep costs down, too. He slots the part shown in 90 seconds on a $5,000 DoALL band machine. Slotting formerly took 2¾ minutes on a $12,000 milling machine. Set-up time on the DoALL is less than 5 minutes. Previously it took 20 to 30 minutes.

American industry needs thousands more time-saving tools like the DoALL machine. Then, with fewer people required to produce the necessities of life, more people can produce "non-essentials" that make life pleasanter. Things like soft drinks, motion pictures and baseballs.

The "tools" of production provide the beverage for a "break".

For a lot of people that's a new way to look at tools. But it's a true way.

Manufacturers seeking ways to increase human productivity and cut costs will find much of interest at DoALL . . . bandsawing, grinding, lapping and gaging equipment that is accomplishing things in less time than ever before. Ask for descriptive literature.

Reprints of this series on economics available for your employees.

COLOR, SOUND MOVIE "Production Band Machining" available for group showings. Write on your business or school letterhead for details, or call DoALL locally.

The DoALL Company

Des Plaines, Illinois

38 Local Sales-Service Stores E-27

SEALING POROSITY . . .

air also is cleaned out and dehumidified to avoid contamination of the impregnant.

Excess Drained—Air pressure is held for about 30 minutes. The excess impregnant is blown back into the resin storage tank and the pressure in the impregnator released.

The impregnant then must be cleaned from the parts. The basket may be dipped and agitated in a filled tank to dissolve the surface resin. Parts may be more thoroughly cleaned in a spray wash machine.

Baking — The castings are put into an oven and baked at 275 to 325°F for about 2 hours. A pressure bake may be necessary to prevent exudation of resin from the casting during initial polymerization, and as a follow-up to compensate for shrinkage during polymerization and maintain a continuous structure of plastic in the voids.

The basket is removed from the oven, and the castings are allowed to cool. A pressure test is carried out and defective castings returned for re-impregnation.

Materials—There are two major impregnating materials, sodium silicate and polyester resins. Both are limited to specific applications. Sodium silicate is soluble in water; the polyesters are fluids in themselves. Here's how they compare:

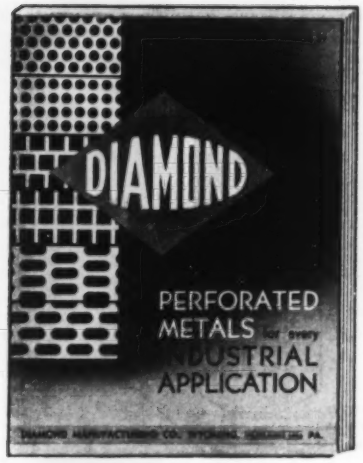
Sodium Silicate Impregnant

ADVANTAGES

1. Resists high temperatures.
2. Nonexplosive.
3. Resists organic solvents.
4. Material not in large demand.
5. Less capital equipment needed.
6. Finish baking can be eliminated if casting will not be in contact with water.

DISADVANTAGES

1. It is alkaline and reacts with aluminum, magnesium and zinc. It is not suitable on finished surfaces.
2. It is 50 per cent water. As water evaporates, a gel is left which might allow casting to pass pressure test. On further evaporation, the casting might fail.
3. At 300°F or over, foaming occurs with a case hardening effect. Residual moisture may cause a violent reaction, bleed-



This 32-Page Catalog Points the Way to Improved Design of Many Modern Products

Diamond Perforated Metal is an important factor in the design and construction of more products that enter into every-day life than most people realize.

In Space Heaters, for example, in Air Conditioners, Television Sets, Diffused Lighting Fixtures, the Ornamental Enclosures which conceal your radiators, the Spinner Basket of your washing machine, the Screens which help prepare the coal you burn and the food you eat.

Industrial applications cover an even wider range—from Machinery Guards and Sound Control Equipment to Stainless Steel Screens for oil refineries and synthetic rubber plants. New applications are developing every day as we keep in step with the requirements of engineers, chemists and industrial designers.

Catalog 39 shows many modern applications; gives all the illustrations and working data you need to plan ahead. Write, today, for a free copy and tell us about ANY requirement for perforated metal. We are equipped to fabricate complete parts, if desired, and our engineers welcome opportunities to make money-saving suggestions.

DIAMOND MANUFACTURING CO.
Box 32 WYOMING (Wilkes-Barre Area) PENNA.

West Coast Plant, Diamond Perforated Metals Co.
17915 So. Figueroa St., Gardena, California
Los Angeles Area

SEALING POROSITY . . .

ing water glass and forming blisters.

4. Shrinkage after setting is about 50 per cent of original volume. Poor permanent filling exists. Sometimes, three or four impregnations are required.
5. Water soluble until baked. Surface porosity revealed on baking.
6. Abrasive action dulls tools and ruins bearing surfaces.
7. Hydrofluoric acid, the cleaning agent for magnesium, causes porosity due to etching action on silica.
8. Impregnation must be done at elevated temperature.
9. Reservoir requires heating and agitation.
10. Sludge will form at surfaces and decrease heat transfer efficiency.
11. Removal of sludge requires 25 per cent caustic soda solution boiled in tank for at least 48 hours.
12. Wash and test water require frequent change.
13. Excess deposits are difficult to remove.

Polyester Impregnant

ADVANTAGES

1. 100 per cent solids. Minimizes rejections for porosity after impregnation.
2. Shrinkage is 4 to 6 per cent of volume.
3. Chemically neutral. Will not attack metals.
4. May be used on finished surfaces.
5. Nonabrasive.
6. Unaffected by solvents and lubricants common to aircraft service.
7. Impregnation done at room temperature.

DISADVANTAGES

1. Satisfactory only up to 400°F.
2. Greater capital equipment required than is necessary for sodium silicate.
3. Polyesters are inflammable.
4. Additional handling required.

In general, it can be said that if the rejection rate due to porosity exceeds 15 per cent, it is far more economical to impregnate 100 per cent of the castings than to attempt to inspect 100 per cent and impregnate rejects.

A COMPLETE REFRACTORIES SERVICE . . .

for the Steel Industry

OLIVE HILL BF and OLIVE HILL HI-FIRED brick rank high in any list of prominent and widely used brands of blast furnace refractories. Manufactured from dense-burning Kentucky flint fire clays by Grefco's unique manufacturing processes, OLIVE HILL brick set a standard for blast furnace refractory quality and workmanship.

Grefco processing of OLIVE HILL brick entails:

1. Careful selection, testing, stockpiling and blending of fire clays to insure uniform raw material quality.
2. Grinding and screening to prescribed formula to promote high density of product.
3. Efficient deairing during brick forming, also to promote density and proper physical structure.
4. Careful firing to exacting temperature schedules yields uniform high quality brick.
5. Close inspection of final product with gauging and sorting of brick to close size tolerance.
6. Quality control by statistical analysis procedures for the manufacturing processes.

In service, OLIVE HILL blast furnace brick, both BF and HI-FIRED, have produced many splendid performance records in the past. OLIVE HILL linings in presently operating furnaces, are giving outstanding performance and are more than meeting the increasing requirements of the expanding American Iron and Steel Industry.

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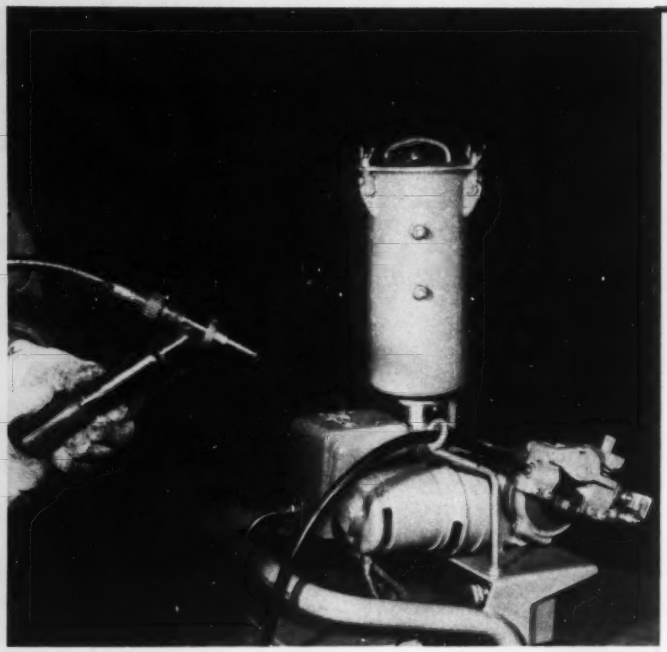
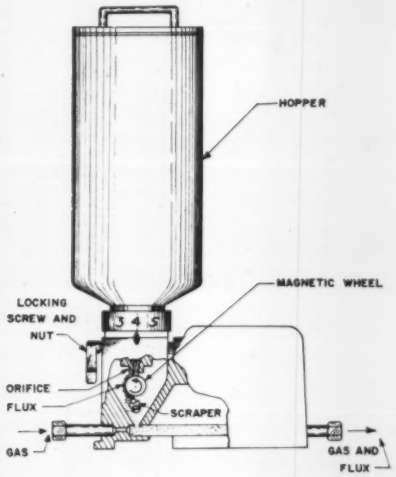
GENERAL REFRACTORIES



Here's the equipment. Hopper, wire feed and reel are at the right; operator holds the torch. Control buttons are on the torch handle under operator's thumb



The flux and CO_2 are mixed under this hopper. Flux flow is adjusted by turning the hopper which changes the gap between orifice and magnetic wheel

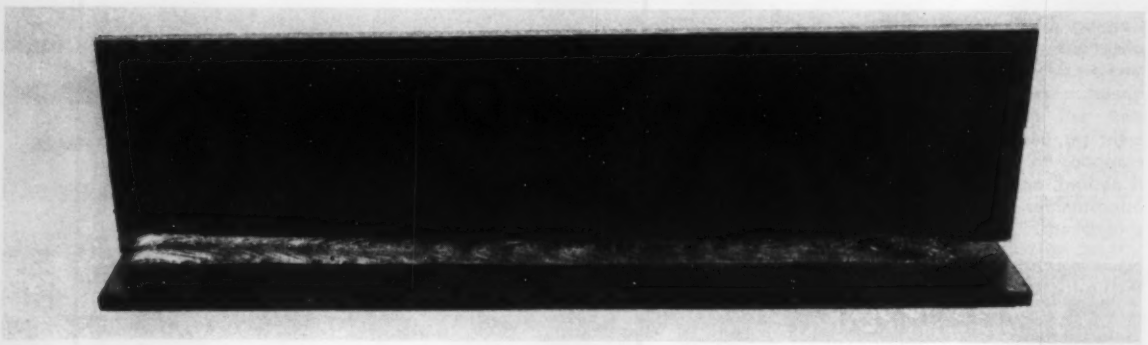
Here's a New Welding Process

UNIONARC welding is said to offer these advantages:

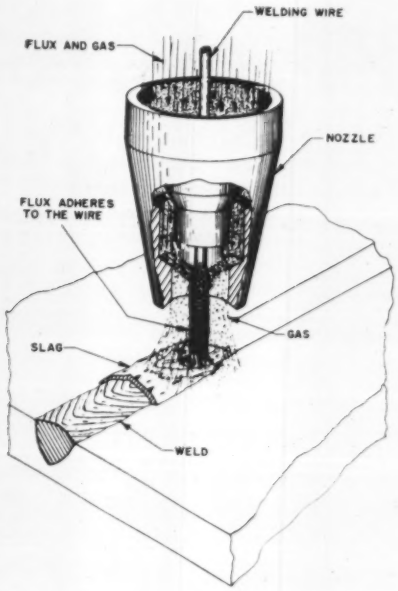
1. It's up to 50 per cent faster than systems using coated electrodes. (It deposits 15 lb per hour.)
2. It produces strong welds—78,000 to 85,000 psi ultimate tensile.
3. It overcomes poor fitup.
4. Deposits are exceptionally smooth, almost free of ripples, and (in buttwelds) they are practically flush with the surface.
5. It will produce sound welds even if the steel is covered with moderate amounts of scale, rust and moisture.

The process was invented by Linde Air Products Co., a division of Union Carbide & Carbon Corp., New York. It was previewed recently at the firm's Newark, N. J., laboratories.

How It Works—You need a special torch, flux hopper, welding con-



This fillet will give you an idea of how poor fitup can be overcome. Joint is touching (left); gap at the right is slightly less than



This is a cut-away view of the business end of Unionarc. Gas and flux pass around the wire to shield the weld zone. Colored insert is copper contact for wire

New Process Promises Better Welds

Here is Linde's comparison of Unionarc and the coated electrode method. It assumes that an operator spends 40 per cent of his time welding with coated electrodes, 50 per cent with Unionarc. Labor rate is $2 an hour and overhead is 150 per cent of labor. Comparison is for 100 ft of ¼-in. horizontal fillet weld.

	Coated Electrodes		Unionarc
	E-6012	E-6024	
Materials	$2.96	$3.72	$4.58
Labor	9.73	7.45	4.00
Overhead	14.60	11.18	6.00
Totals	27.29	22.35	14.58

It combines a continuously fed wire, CO_2, a magnetic flux and direct current to produce a sound, clean-looking weld in mild steel. It is semiautomatic

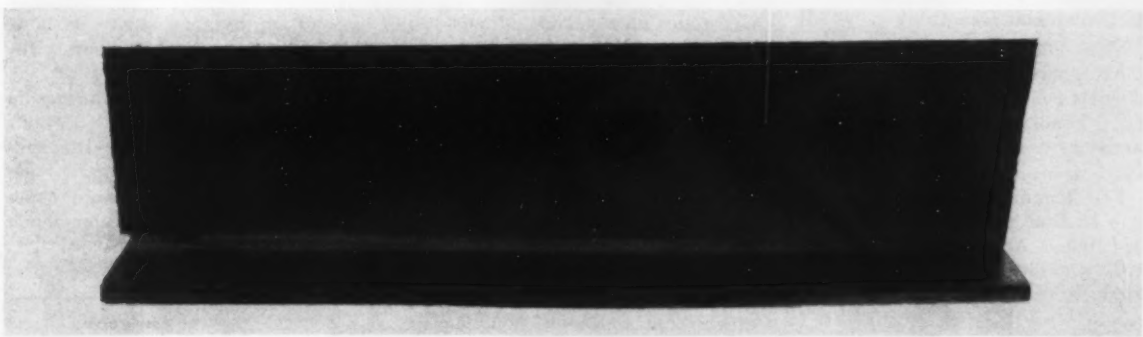
trol, a wheeled base with wire dispenser, and a constant-potential power source. The torch looks like the one used for Heliarc except it's air cooled. It will handle 450 amperes and is connected to the welding flux, control and wire feed with flexible cables and hoses.

At the bottom of the hopper, flux drops on a magnetized roll. As it turns, a scraper removes the flux which drops into the CO_2 feed and passes on to the torch.

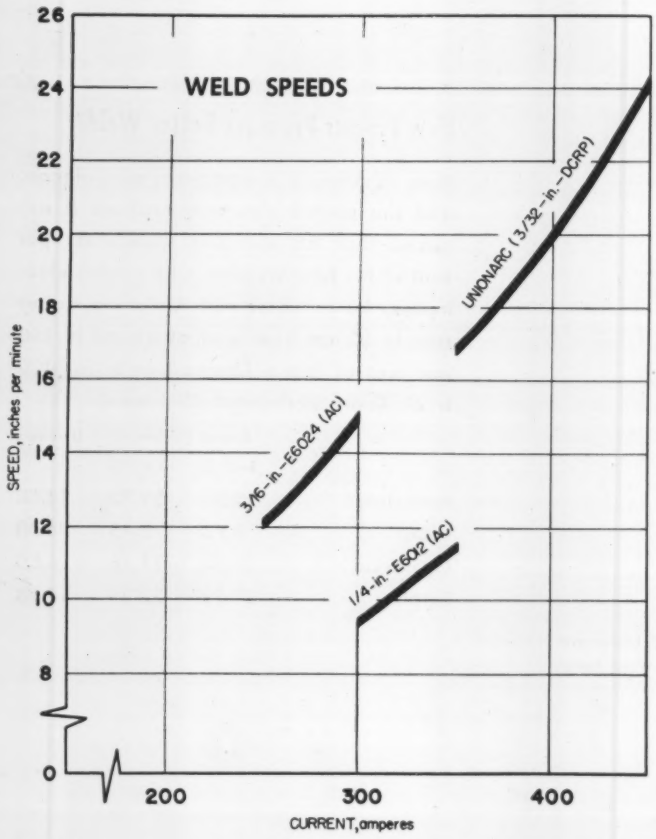
A switch in the handle controls the operation of the welder.

The welding control, flux dispenser and a 300-lb coil of wire are mounted on a compact, four-wheeled stand.

Combination—Although magnetic flux has been tried before, Unionarc combines it with CO_2 and a continuously fed electrode. The flux is magnetized and fluidized at the hopper and passes through the hose to the nozzle. There, the wire, charged by the current passing through it, attracts the magnetized flux as it leaves the nozzle



metal thickness (¼-in.). The view above gives an idea of the kind of penetration you can expect under such conditions



This chart will give you an idea of the speed in making ¼-in. fillet welds. The method works well at 450 amperes

for the arc. The flux melts, refines the weld metal, and, with the CO_2, protects it from atmospheric contamination. The arc is visible.

The flux has four jobs: 1. With the gas, it stabilizes the arc and the stream of molten metal passing through it to the puddle. 2. It deoxidizes the metal. 3. It reduces the surface tension of the puddle, flattening and smoothing it. 4. It lowers the cooling rate.

Arc character is similar to that of coated electrode welding. Under most conditions, metal is transferred in a spray with little spatter.

The technique also is comparable to that used with the coated electrode. Any operator familiar with standard rods can produce good welds with a few hours of practice, says Linde.

The electronic control unit regulates the sequence of starting and stopping the current, wire, flux and gas. It also maintains correct welding conditions. Components are standard units which have worked successfully on systems like Heliarc.

Rate—Using a 3/64-in. wire and a 0.4 flux-to-wire ratio, Linde compares its new method with the use of conventional E-6012 and E-6024 electrodes on a variety of jobs and finds that on an average, the weld metal deposit is two to three times greater.

Deposition rate is approximately equal to wire feed (or burnoff rate). Spatter loss is low, and what little adheres to the surface is easily removed.

Unionarc will produce a weld of radiographic quality. Standard side, root and face bend tests indicate that welds are sound. Here are some weld properties:

Yield (0.5 per cent offset), 66,000 psi; ultimate tensile, 78,000 psi; elongation in 2 in., 28 per cent; reduction of area, 65 per cent; Charpy vee notch (15 ft/lb transition), minus 40°F; hardness, 75-85 Rockwell B.

Price — Linde asks $2400 for the machine, torch, regulator and connected equipment. Wire (3/32-in.) costs $14.50 per 100 lb, flux 35 cents a pound. You must supply a power source, and the license fee is 2½-cents for each pound of wire you use.

Linde says savings will amortize the outlay in a reasonable time if you switch from the coated electrode method and use Unionarc more or less continuously. There is a saving in setup time—no adjustments are needed to change welding position.

Evaluation—In addition to benefits previously cited, build-up is low—a plus feature if you have to grind welds.

At a demonstration witnessed by STEEL, the operator attempted a fillet weld on one piece which was badly fitted—in a 12 in. length of ¼-in. steel, the leg of the T touched at one end and showed a gap of more than ¼-in. at the other. With a low current (about 200 amperes), he made a good weld from one end to the other, with no controller adjustment, although there was increased spatter compared with a 450-ampere sample previously shown.

Opinion—Caterpillar Tractor Co., Peoria, Ill., has been evaluating Unionarc for some time. George Armstrong, superintendent of the Joliet, Ill., plant has this to say: "We like Unionarc. You can see what you're doing at all times, and there's no stopping to change rods. As a result, we get continuous seams. We have found that you can fill up a large cavity without bridging—fitup can be poor without affecting the quality of the weld. The really big advantage is its adequate penetration."

Mr. Armstrong thinks the system is "well worth trying." He feels that Linde can make some improvements and recommends better moisture controls for gas and flux.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

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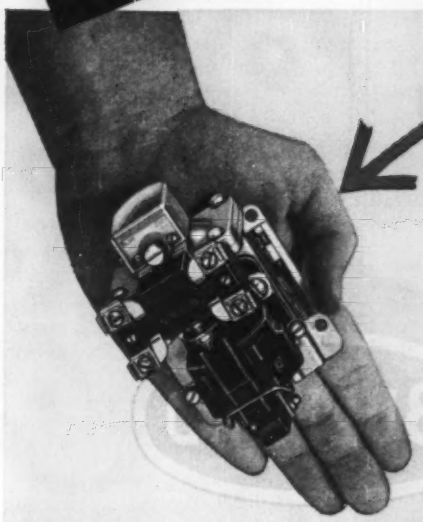

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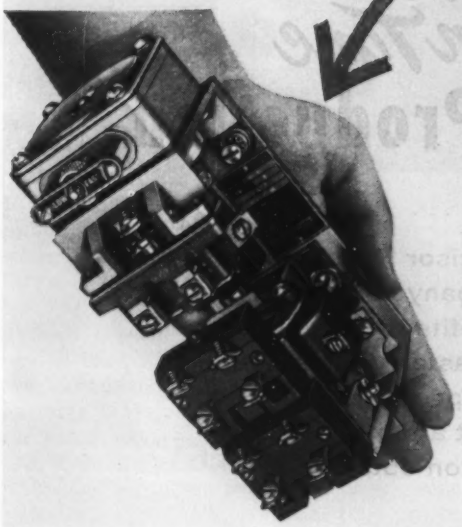

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COMPARISON	TYPE A	TYPE B
Timing Period	.2 to 1 min.	.2 to 3 min.
Accuracy	±15%	±10%
Interlocks	None	Max. 2 Double Circuit
Panel Space	2⅜" x 4"	2½" x 7⅜"
Convertible Delay-On • Delay-Off	Yes	Yes
Maximum Voltage AC—DC	600 V. AC only	600 V. AC 250 V. DC

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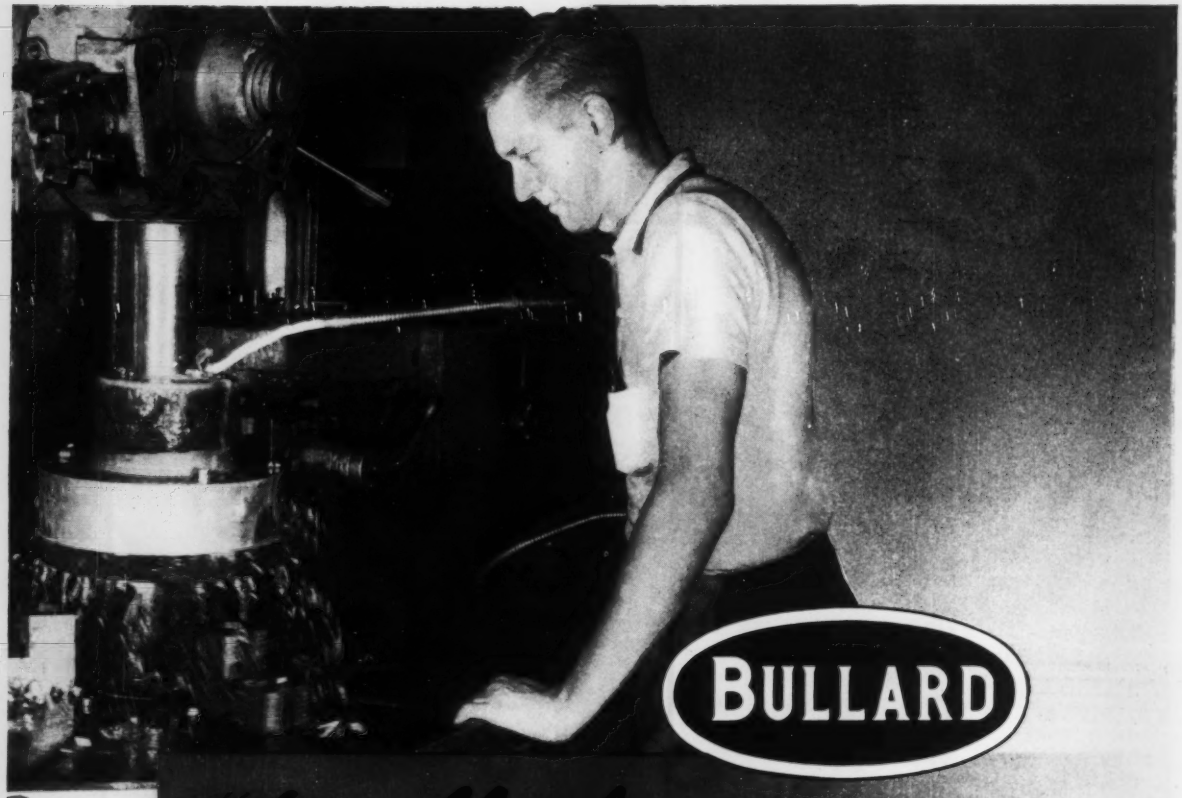

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This statement by Methods Supervisor Raymond Hoss of the Ingersoll Milling Machine Company of Rockford, Illinois summarizes one of the benefits they received from the purchase of a 36" Cut Master V.T.L., Model 75. Less operator fatigue, higher speeds, power chucking and power indexing turret are other factors which increase the overall production obtained with Bullard Cut Master, Model 75.

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Capacity of Storage Battery Enlarged

The TG Exide-Ironclad Giant packs more power into a given space. It has a rated capacity of 72 ampere-hours per positive plate. This compares with the 50 ampere-hour rating of batteries still widely used and the 60 ampere-hour capacity of more modern batteries.

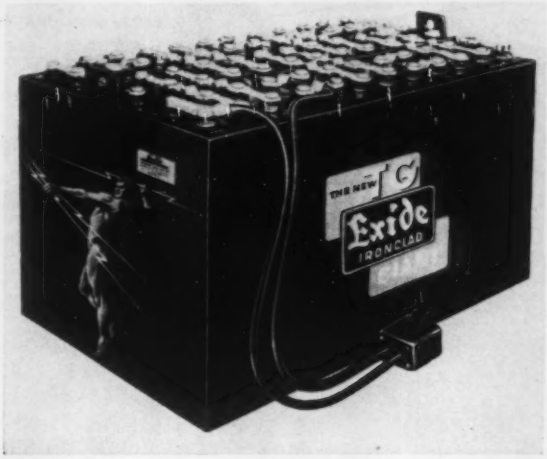
A new type of armored porous tubing which encases the grid splines and active material of the positive plates is responsible for increasing the battery's capacity.

This tubing is highly permeable to the diffusion of electrolyte and the passage of current. It facilitates the electrochemical action and is particularly effective at high discharge rates.

The tubing prevents loss or shedding of active material. Electrochemical action within the battery does not affect the tubing material, and it resists acid attacks.

Elasticity of the tube holds the active material firmly in contact with the grid splines during battery cycling.

At a 6-hour discharge rate (common for electric powered industrial trucks) capacities range from 360 to 1152 ampere-hours.



The battery comes in finished steel trays in 11 sizes, with 11 to 33 plates. *Write*: Department TG, Exide Industrial Division, Electric Storage Battery Co., Box 8109, Philadalphia 1, Pa. *Phone*: Locust 4-4030

Power Saw Has Automatic Band Tensioning

Model C-12 is powered by a 1½-hp motor through four step cone pulleys which give blade speeds of 90, 125, 180 and 250 sfpm.

Accuracy of cut is 0.002 in. per inch of diameter. High speed steel saw blades 1 in. wide and about 130 in. long are used. Typical cutting rates: Less than 2 minutes for a 5-in. round of mild steel, 5 minutes for a 3½-in. square of 18-8 stainless, 19 minutes for an 11¾-in. round of oil hardening tool steel.

Work capacity is 12 x 12 in. and 1500 lb. The saw is easy to set up and operate—features which are particularly useful in shops where a full time operator is impractical and many men use the saw for cutoff jobs.

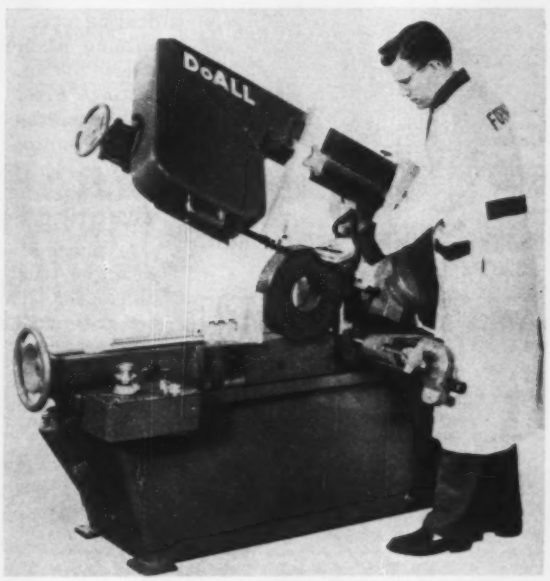
A hydraulic cylinder makes band tensioning automatic and simplifies machine setup by relieving the operator of the job of estimating proper tension for the saw blade.

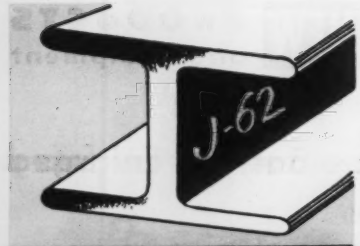
The same hydraulic system that provides band tensioning pressure is used to control the feed and raise the sawing head.

A hydraulic valve provides rapid travel (either up or down), a stop position and a feed position.

In the feed position, a calibrated, adjustable orifice permits the selection of any feeding rate down to zero.

Safety device: A solenoid operated lock is incorporated in the hydraulic circuit. When power is interrupted for any reason, the head is locked in position automatically and damage to the saw blade is prevented. *Write*: DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. *Phone*: Vanderbilt 4-1122





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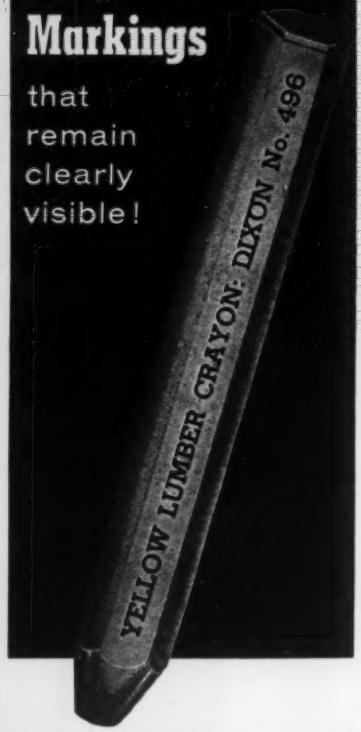

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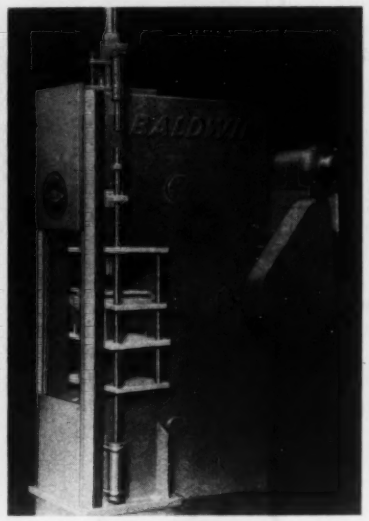
NEW PRODUCTS and equipment

Compacting Press

The Baldwin 30-W is a lever-type press rated at 30 tons. Designed for powdered metals, it also efficiently compacts complicated cross sections with other materials —ceramics, carbides, cermets and ferrites.

The head stroke is 6¾-in. Depth of fill is adjustable up to 4½-in. The die opening is 10 in.



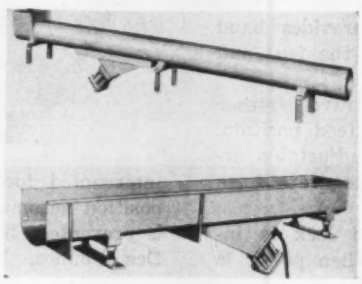
Accessories can be added in the field. Example: An independent floating core rod support for the forming of blind or counterbored holes. *Write*: Hydraulic & Compacting Press Department, Box 174, Hamilton Division, Baldwin-Lima-Hamilton Corp., Hamilton, O. *Phone*: Twinbrook 4-6511

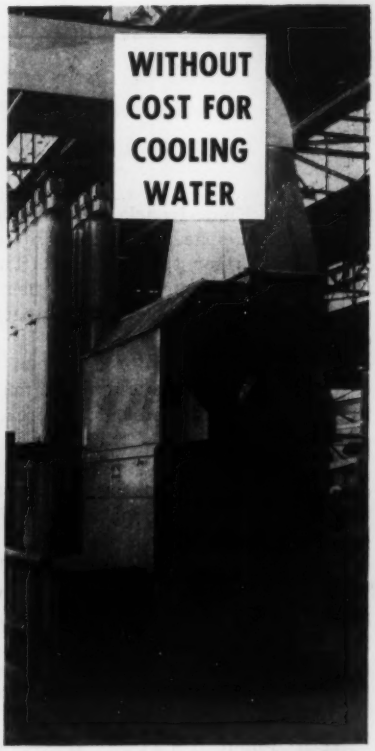
Vibrating Feeder

A pneumatic drive mechanism generates the vibrating force of this feeder. There is only one moving part and no cams, bearings, belts or gears.

Small parts and bulk materials can be fed up a 20 degree incline.

Feed rates are easily changed





ACCURATE TEMPERATURE CONTROL of Hydraulic Liquids PREVENTS LOSSES

• This NIAGARA AERO HEAT EXCHANGER cools the liquid for a large hydraulic press, preventing heat damage to the pump stuffing boxes. Using outdoor air as the evaporative cooling medium, it removes the heat at the rate of input (1,875,000 BTU/hr.) with no cooling water consumption except a negligible amount evaporated.

Similar Niagara machines cool water, oils, solutions, lubricants and coolants for many mechanical, electrical and chemical processes. In a closed system, your coolant is never contaminated. The system is simple and easy to keep up; the equipment has a long, useful life.

Write for Bulletin 120 for a complete description

NIAGARA BLOWER COMPANY
Dept. S-3-1 405 Lexington Ave. NEW YORK 17, N. Y.
District Engineers in Principal Cities of United States and Canada

When a low-hydrogen electrode . . .

Has an iron-powder coating . . .

Yet operates in all positions . . .

WHY use anything but Jetweld LH-70 for hard-to-weld steels

JETWELD LH-70 by LINCOLN

Low-hydrogen, iron-powder, E-6016 electrode for high-speed welding of hard-to-weld steels

DEPENDABLE WELDING FOR
Crack sensitive steels
Alloy steels without preheating
Medium to high carbon steels
Free machining steels

HIGHER DEPOSITION RATE
than conventional low-hydrogen electrodes

EASY OPERATION
in all positions
with high currents

CONFORMS TO
class requirements of E-6015, E-7015 and E-7016.
Meets X-ray requirements.

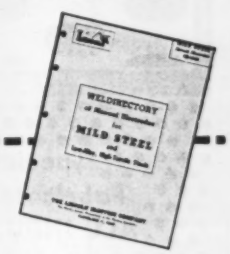
OPERATES ON AC OR DC

THE LINCOLN ELECTRIC COMPANY

Dept. 1626, Cleveland 17, Ohio

Lincoln . . . one dependable source for all your arc welding needs

Send for Bulletin SB-1351 for specifications.



Fill out and mail to:
The Lincoln Electric Company
Dept. 1626, Cleveland 17, Ohio

Send Bulletin SB-1351.

Name_____

Company_____

Street_____

City_____ Zone___ State_____

Position_____

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PERFORATED
METAL
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PERFECT
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Specially
Fabricated for
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BY
CHARLES MUNDT & SONS
53 FAIRMOUNT AVE.
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PHONE—DELAWARE 3-6200
Send for Illustrated Catalog

NEW PRODUCTS and equipment

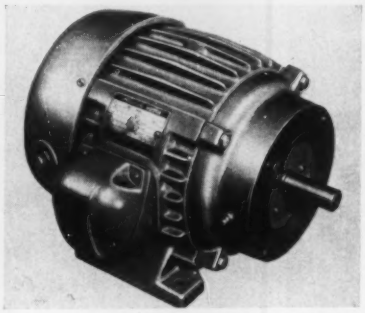
and adjusted. Vibration frequencies are selected by varying the operating air pressure over a range of 30 to 90 psi.

The feeders are of metallic construction and come in pan, trough and tubular designs. *Write*: Cleveland Vibrator Co., 2828 Clinton, Cleveland, O. *Phone*: Cherry 1-7157

Motor Bolts to Equipment

This totally enclosed motor has tapped holes for bolting from the driven equipment side.

The shock resistant, cast iron frame is heavily ribbed for strength and rapid heat dissipation. A guarded fan propels air over the ribs of the frame for maximum cooling and self-cleaning.



A brass slinger prevents moisture from entering at the take-off shaft.

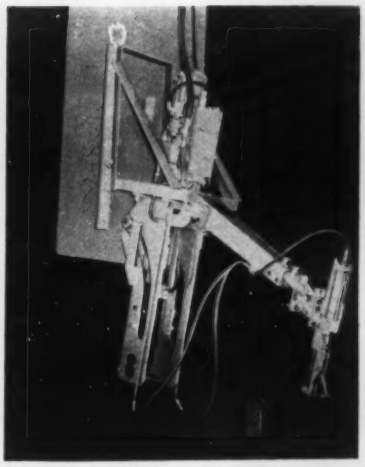
The motor, type J, comes in ratings of 1 to 30 hp. *Write*: U.S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif. *Phone*: Richmond 9-9029

Controls for Unloaders

Automatic unloading machines —including overhead arm press unloaders, portable unloaders, transfer machines and other automation machinery—can be controlled remotely by this electronic system.

Operators can adjust the unloader merely by turning calibrated dials. The unit consists of a compact control panel containing three electronic tube timers and a cable running to the unloader. The unloader contains two operating valves and a motorized flow control valve.

Nine adjustments are possible.



Time delay increments of 0 to 6 seconds are provided. *Write*: Sahlin Engineering Co. Inc. P.O. Box 289, Birmingham, Mich. *Phone*: Midwest 4-7373

Cover Protects Battery

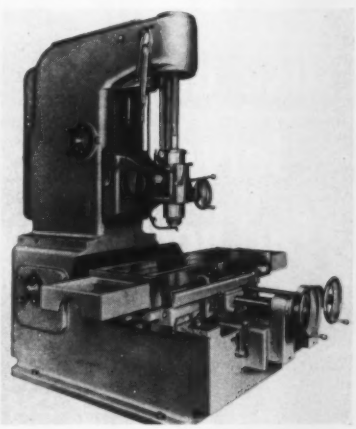
Hi-Impac is a material used for battery containers and covers that practically eliminates damage to cells caused by dropping the battery, being hit by heavy objects or truck collisions. *Write*: C & D Batteries Inc., Washington & Cherry St., Conshohocken, Pa. *Phone*: Taylor 8-1140

Borer Is Versatile

Model 60 is a vertical machine for precision boring and milling. It is built in two sizes both of which have a 30-in. vertical capacity.

The smaller one has an 18 x 52 in. bed-type table. Cross travel is 18 in.; longitudinal travel is 28 in.

The larger has an 18 x 60 in.



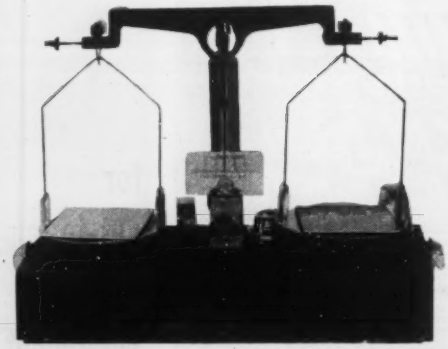
for
cut-to-length
line
equipment
see

Stamco

SAVE WITH STAMCO CUT-TO-LENGTH LINES

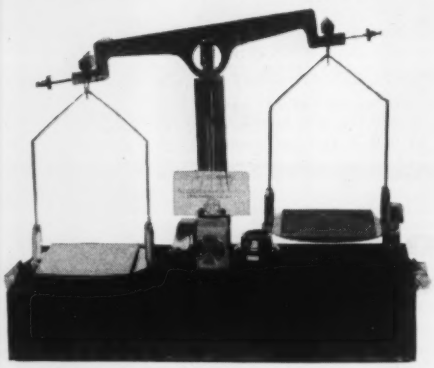
STAMCO cut-to-length line equipment gives you a more efficient and cost-reducing operation. You cut steel the way you want it, when you want it, with easy change-over and with a great reduction in scrap. With Stamco you can store steel in coils rather than sheet bundles, reducing inventory and space. It is a proven fact that a STAMCO installation can PAY FOR ITSELF in a short period of time. Write or call us today for details.

Stamco, Inc., New Bremen, Ohio, U. S. A.



NO WEIGHT DIFFERENCE. Two identical panels of low-carbon sheet steel were used. They balanced the scale.

RODINE MINIMIZES ACID ATTACK. Each panel was placed in a beaker containing 10% by volume of 66° Bé sulfuric acid at 160°F. The acid in the right-hand beaker was uninhibited. The acid in the left-hand beaker was inhibited with Rodine 82, ¼% by volume of the concentrated acid. There was little or no hydrogen evolution in this beaker . . . Rodine retarded the attack of the acid on the base metal.



RODINE SAVES METAL. Both panels were removed from the acid pickle solutions after 5 minutes. The one pickled in the uninhibited acid had lost 1.4% of its original weight. The one pickled in the Rodine-inhibited acid had lost only 0.001%. This represents a saving of 26 lb. of steel for each ton pickled; and a simultaneous saving of nearly 50 lb. of 66° Bé sulfuric acid when Rodine is used to inhibit the acid.

ACP Rodine®

SAVES ACID, SAVES METAL— GIVES YOU MORE STEEL TO SELL

With ACP Rodine as the pickling acid inhibitor, you use less acid and have more steel to sell. Up to 50 lb. of acid is saved per ton of steel pickled and up to 26 lb. of steel. Fuming is practically eliminated. Formation of blisters and embrittlement is minimized. Costs of charging and cleaning of pickle baths are reduced—baths can be operated longer, and less acid is required to keep them at desired concentration. There are fewer rejects—steel pickled in acid inhibited with Rodine has uniformly clean, bright surfaces, free of pits, blisters and smut.

LEARN MORE ABOUT ACP RODINE. Bulletin 1381 tells the complete story. Write for your copy today.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

CHEMICALS ACP PROCESSES

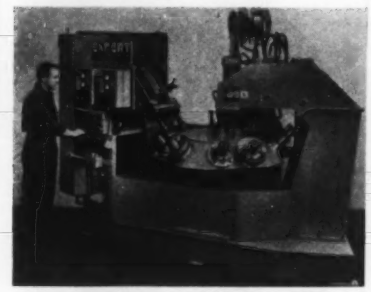
New Chemical Horizons for Industry and Agriculture

table, has 18 in. cross and 36 in. longitudinal travel.

Smooth operation is provided by counterbalancing the spindle and spindle head. *Write*: W. B. Knight Machinery Co., Vandeventer & West Pine Blvd., St. Louis 8, Mo. *Phone*: Franklin 1-0840

Welder Uses Automation

This five-station rotary index machine does both assembly and CO_2 shielded arc welding operations. It can handle parts up to 5 in. diameter that require press type assembly and circular weld joining.



The machine illustrated assembles and welds 500 flat circular plates to the inside of cylindrical parts in an hour.

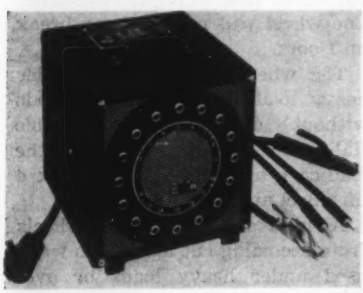
Power for the cam drive is supplied by a 1½-hp electric motor.

Two 800-ampere rectifiers supply the welding current. *Write*: Expert Welding Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

This Welder Is Portable

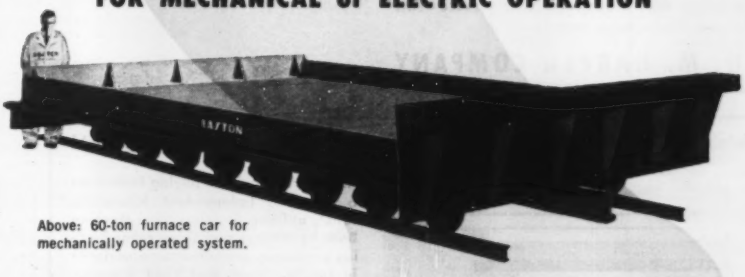
Model 200B is an industrial arc welder that weighs only 80 lb and is fan cooled for production use. A thermal overload switch prevents transformer burnout.

The unit will weld steel 1½-in.



Furnace Cars

FOR MECHANICAL or ELECTRIC OPERATION



Above: 60-ton furnace car for mechanically operated system.

CUSTOM-BUILT and quality-built for dependable service. Easton experience includes all types of furnace and transfer cars for modern heat treating systems. Built to any desired capacity.

Write or telephone for technical information.

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A-1083

New

ARMSTRONG

Armide **CARBIDE INSERT TOOL HOLDERS**

The advantages of Carbide Cutters with the Multiedged "throw away" ARMIDE inserts

Write for Bulletin CIT

New ARMSTRONG Armide Carbide Insert Tool Holders hold multiedged, throw away Armide inserts. They end tool grinding and reduce down time. After an edge dulls, a slight turn of the clamping screw permits rapid indexing of the insert to a new cutting edge. Triangular inserts have 6 cutting edges; square inserts have 8 edges. They are available in three grades—Armide 350, 370, or 883.

ARMSTRONG Armide Carbide Insert Tool Holders are furnished either "Right Hand" or "Left Hand" in the two styles illustrated, each in 3 sizes.

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

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Buy ARMSTRONG TOOLS from your Industrial Distributor

Immediate delivery from 150,000,000 standard items in Stainless, Monel, Aluminum, Brass, Bronze, Copper!

Thousands of Harper corrosion-resistant fastenings are in Harper Distributor stocks across the country! Even more thousands are continually on hand at The H. M. Harper Company for your convenience! A phone call to your Harper Distributor will do the trick! Why shop? Why wait? For immediate delivery, specialized service—call your Harper Distributor now!

THE H. M. HARPER COMPANY
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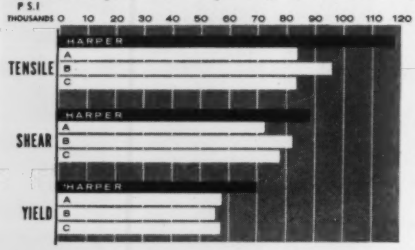
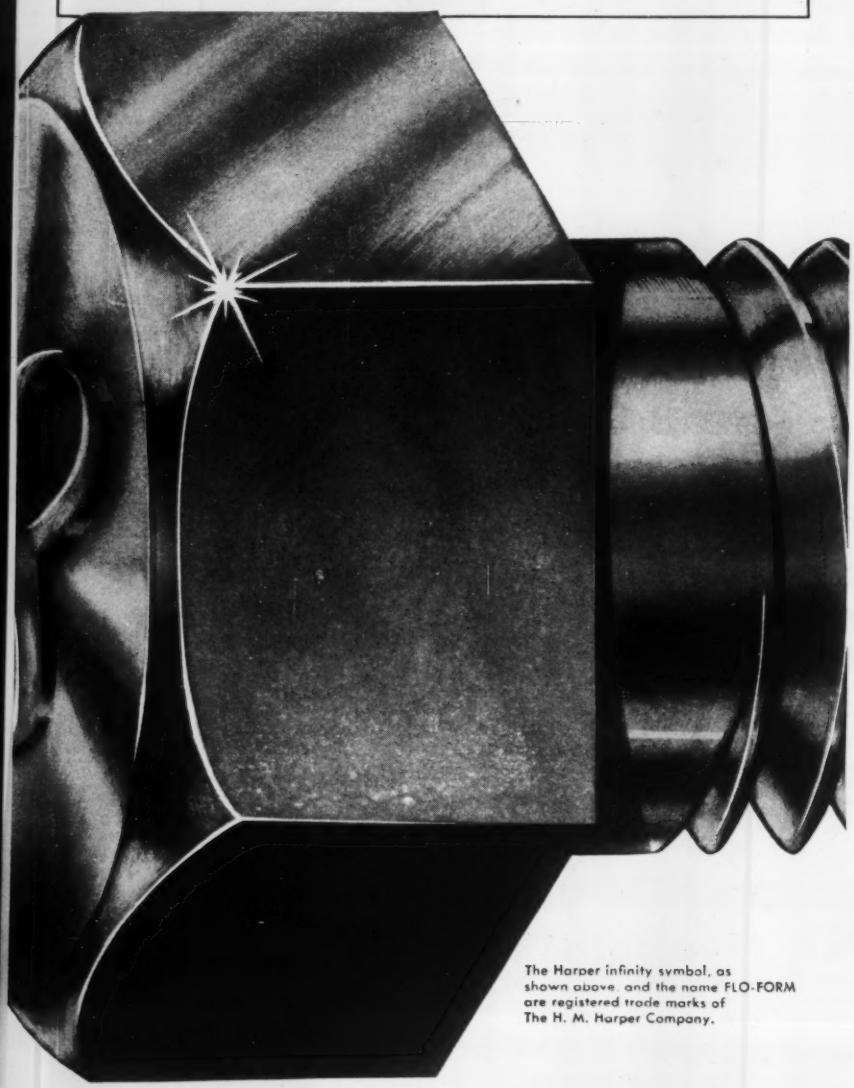
HARPER

Irrefutable proof of Harper's greater metals' strength shown by laboratory test!



An important point in buying fastenings is strength. Independent laboratory tests*, utilizing Stainless Steel Machine Bolts by Harper and three other leading producers, prove Harper superiority in Tensile, Shear, and Yield Strength. The chart at left shows the actual results of these tests. For complete information on these important tests, request Form No. 126.

*By R. W. Hunt Laboratories



The Harper infinity symbol, as shown above, and the name FLO-FORM are registered trade marks of The H. M. Harper Company.

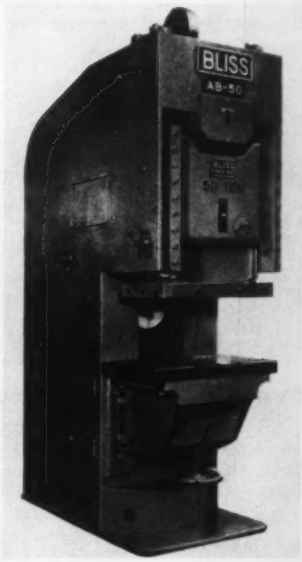
NEW PRODUCTS and equipment

thick and cut ¼-in. steel. *Write*: Brennen, Bucci & Weber Inc., 262 Mott St., New York 12, N. Y. *Phone*: Canal 6-2356

Bed Presses Adjustable

This line of presses has a fully enclosed, box type frame. Capacities range from 50 to 150 tons.

Air controls and the recirculating oil unit are enclosed on the left-hand side of the press. Controls for the press and motor are flush mounted on the right-hand side.



Other features: Box crown, box slide, fast acting air friction clutch and brake, an adjustable rotary limit switch, bronze-bushed bearings. *Write*: E. W. Bliss Co., Canton, O. *Phone*: 7-3421

Wheel Carries Big Loads

The Disowheel has low rolling resistance, a resilience value of about 25 to 60 per cent, plus good oil, ozone and sunlight resistance. The wheel will not mark or break up floors.

The wheel can stand up under heavy loads for extended periods without developing appreciable flats. One manufacturer rates the load-carrying capacity of a 3 x 4 in. wheel at 2000 lb.

A high modulus keeps wheels from becoming cut up or torn when used under heavy loads or over

rough floors. *Write*: Greer Industries Inc., New York International Airport, Jamaica 30, N. Y. *Phone*: Olympia 9-9700

Grease Has Long Life

Gulfcrown grease is a multipurpose lubricant designed to stand up under high and low temperatures, the action of water, high-speed bearing action and long storage. It has a lithium base.

High oxidation stability provides long life in use and in storage. High mechanical stability keeps the grease from thinning and running out of bearings.

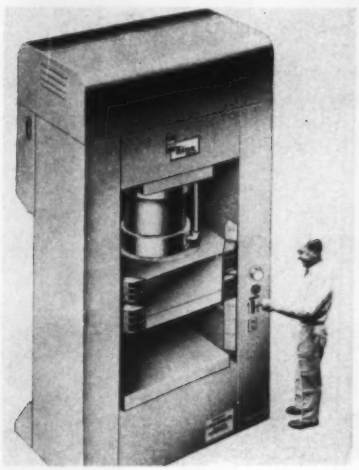
Resistance to the washing action of water is high, and the grease flows readily in cold weather. *Write*: Gulf Oil Corp., 1822 Gulf Bldg., Pittsburgh 30, Pa. *Phone*: Express 1-2400

Press Can Boost Capacity

Model 300A King presses come in 65, 125, 170 and 300-ton capacities. Kits make it possible to easily convert the 65-ton press to any of the higher capacities.

The entire hydraulic system, a package unit, is mounted in a tray on top of the press.

Rigidity and torsional load resistance are provided by the in-



HARPER®

CORROSION-RESISTANT FASTENINGS

SPECIAL PARTS? Harper's exclusive Flo-Form Process solves these problems at big savings!

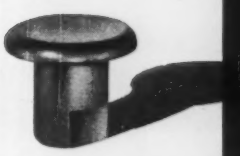
There's no part too tiny, too large, or too complex for Harper Flo-Form! This remarkable process could only be developed by Harper, with its wealth of thirty-three years' experience in corrosion-resistant fastenings. Where others mill from bar—Harper Flo-Form produces by cold or hot forging under tremendous pressures. The results?—a *better* product, *faster*, at *lower cost!* Place your "special problem" in the hands of the Harper Flo-Form team of design engineers, metallurgists, and tooling specialists. Write Harper, or call your nearby Harper Branch for Harper Application Engineering Service. Your problem is *our* problem.

THE H. M. HARPER COMPANY

8207 LEHIGH AVE., MORTON GROVE, ILLINOIS

Meet Harper Application Engineer, LEON HAMLET

Every day sees new special parts problems submitted to Mr. Leon Hamlet of the Harper Branch in Milwaukee. Mr. Hamlet in turn, works with the Harper Flo-Form Engineering Team to provide the *right answer* at the *lowest possible cost.*



Vinson Steel and Aluminum Co.
Dallas, Texas says:

Shearing capacity of this machine is 12'-0" x ½" mild steel. Note accessibility of two cranks on right end housing. Upper crank is for knife adjustment. Lower one is for back gauge adjustment.

Adjustable Blade Clearance Allows Use of Shear for Complete Range of Thicknesses

THE feature that Vinson Steel and Aluminum Company likes best on their Steelweld Shear is the adjustable blade clearance. This permits them to use the one machine for their complete range of thicknesses. They go as low as 26 gauge galvanized material and up to ½ inch mild steel and ½ inch aluminum.

As a leading supplier of metal in North and West Texas, Vinson insists on cuts being sharp, straight and accurate. This requires that the blade clearance be correct for every thickness cut. Because of the unique easy method of adjusting the clearance on Steelweld Shears, the adjustment can be made in seconds.

Another item which is impressive is the low maintenance cost. This machine has been in service for over two years, and the maintenance has been practically nil.

More and more warehouses are installing Steelweld Shears. Usually one will handle a range of work that would require two or more other type machines not built with a fast knife adjustment feature.

GET THIS BOOK!

CATALOG No. 2011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
7852 East 282nd Street, Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

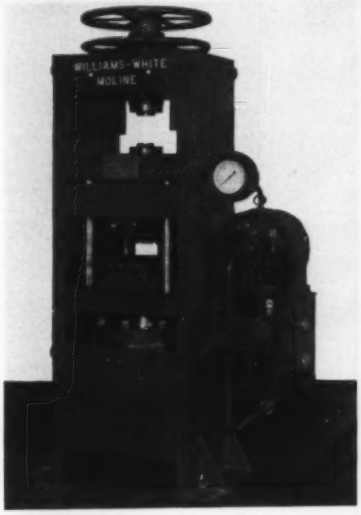
ternal ribs used in the welded construction.

The platen is 26¾ x 32 in. The stroke is 12 in.; the daylight opening 25 in. *Write*: A. Dale Herman Inc., 17071 Ventura Blvd., Encino, Calif. *Phone*: State 9-0349

Press Tests Wire

This 100-ton hydraulic press shears and upsets samples of wire to test their quality and upsetting characteristics.

A knee-operated, four-way valve controls the moving platen which actuates both the shearing and upsetting operations.



Moving the control causes the shearing attachment to double shear samples from wire test rolls. (The attachment can shear ten different diameters without a tool change.) The sheared sample falls into a box where the operator can reach it and put it in the upsetting attachment.

The platen stroke, the upsetting attachment and the tonnage exerted can be adjusted. *Write*: Williams-White & Co., Moline, Ill. *Phone*: 2-3601

Liquid-Gas Separator

The Liqui-Jector removes entrained liquids and solids from air, gas and steam systems.

The unit operates by phase separation: Solids are tapped; liquid is passed in one direction and gas in

an ounce of prevention!

It pays to periodically check the "health" of your blast-cleaning operation to prevent costs from creeping up. You may not be doing as well as say, a year ago. A check on abrasive prices (some have increased more than others), on abrasive consumption, on tonnage cleaned and on cost of replacement parts, will tell.

Such a check is easy to make using simple forms we supply. A sample set will be sent you on request.

One thing sure — if your operation is "ailing," Malleabrasive will cure, as it has in hundreds of other plants.

Competent service personnel available without obligation.

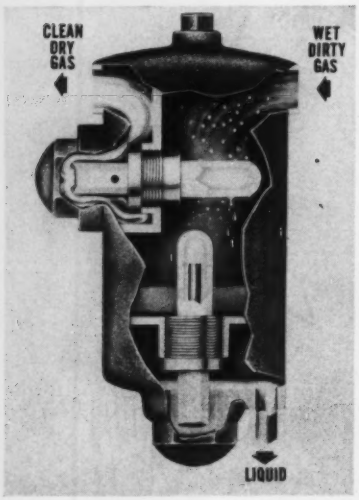
Sold by Pangborn Corporation, and by leading distributors of foundry supplies from coast to coast.

MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

1907—Fiftieth Anniversary—1957

NEW PRODUCTS and equipment



another, without interrupting the flow through the line.

Twelve standard sizes are available. Special units are built. *Write*: Selas Corp. of America, Dresher, Pa. *Phone*: Garfield 6-7600

Endothermic Generator

This compact unit consists of a catalyst-filled heating chamber, gas pump, heat exchanger and controls —all mounted on a steel frame.

The generator, Model MK-524-EN, produces 250 cu ft of atmosphere an hour.

The atmosphere can be used in furnaces doing any of these heat treating processes: Bright hardening of medium and high carbon steels, alloy carbon steels and high

Here are our published performance specifications for Federated Tenzaloy: Castings aged 10-14 days at room temperature.

Yield strength	35,000 psi
Tensile strength	25,000 psi
Elongation (in 2 in.)	4-5%
Brinell Hardness No.	74
Impact strength (Charpy in ft.-lbs.)	
Notched	3
Unnotched	14
Electrical Conductivity	35%

FEDERATED products:

Aluminum, Babbitts, Brass, Die Casting Metals, Fluxes, Lead and Lead Products, Magnesium, Plating Materials, Solders, Type Metals, Zinc Dust

Do you hear meaningless claims when you buy self-aging Aluminum Alloys?

Federated Tenzaloy is the most widely used of all high-strength, self-aging aluminum alloys because it has the highest yield strength, and it has the best all-around combination of properties. Yield strength is the true measure of a metal's ability to take punishment, regardless of other claims that are made.

When you buy Federated Tenzaloy, you can be sure it will perform as well as its specifications indicate. Tenzaloy is produced under the supervision of ASARCO's Central Research Laboratory, where refining and testing techniques control impurities to parts per million, if required.

Hundreds of foundries and manufacturers use Tenzaloy where heat treating is impractical because of casting design or size. Hundreds more cast Tenzaloy because heat treating facilities are not available.

Why not ask your Federated field man to tell you who uses this metal and how? He will be around to see you soon, and it will benefit you to talk to him.

Federated Metals ASARCO

Division of

AMERICAN SMELTING AND REFINING COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

speed steels; annealing and normalizing; bright copper brazing; sintering and powder metallurgy processes; and carburizing and carbonitriding.

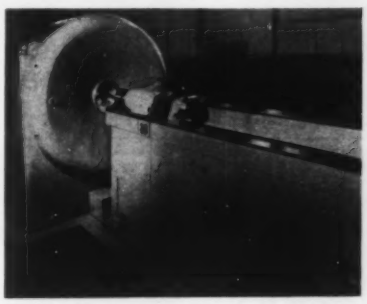
Air and gas flows are adjusted in one step. Temperatures are controlled accurately by an indicating and controlling pyrometer.

Primary and secondary pressure gages give the operator a visual check on the operation. *Write*: Hevi Duty Electric Co., Milwaukee 1, Wis. *Phone*: West 3-2756

Cold Forming Machine

The No. 4 Fellow-Appel machine has a forging and feeding unit joined together.

Work is fed into the forging unit where dies are forced onto the work in a direction radial to its center.



The machine makes cylindrical parts which require bores of close tolerance and a high degree of surface finish.

Both ferrous and nonferrous metals can be cold formed as long as the metals are ductile. Splines and other internal shapes can be made. *White*: Fellows Gear Shaper Co., Springfield, Vt. *Phone*: Turner 5-2131

Broaching Plus Machining

This multistation machine does surface broaching and drilling, reaming and chamfering.

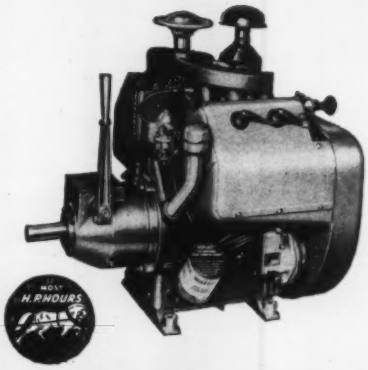
It handles two parts at a time, doing 14 operations on each. Output: 304 pieces an hour at 80 per cent efficiency. Index alignment is accurate to within 0.0005 in. Loading and unloading take 8 seconds.

The machine is made of standard basic units and is said to be

HYSTER QC 20 Lift Truck

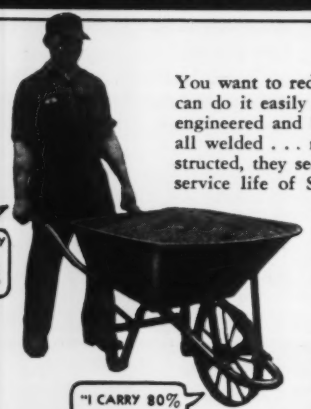
POWERED by NEW VH4 WISCONSIN ENGINE

Hyster Co. specifies the new VH4 30 hp. Wisconsin Engine for the Model QC 20. In the next fork truck you buy, insist on this great new Wisconsin Engine, too. You get foolproof air-cooling, a smooth low-speed "idle" and incomparable horsepower in an engine of this size. Maintenance is simpler . . . no coolant to watch in freezing temperatures. Also, your Wisconsin Engine delivers more torque for more work, and its rugged construction assures longer engine life, more engine stamina. Write for complete data . . . Bulletin S-196.



WISCONSIN MOTOR CORPORATION
World's Largest Builder of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

Any Way You Figure It...
STERLINGS COST LESS PER YEAR



You want to reduce your material transport costs? You can do it easily with Sterling Wheelbarrows. They are engineered and built for the tough jobs. All steel . . . all welded . . . no rivets . . . barrows so ruggedly constructed, they seem to last forever. The unusually long service life of Sterling Wheelbarrows protects your initial investment. And maintenance costs are almost nil. Compared to other barrows, Sterlings actually cost less per year. Get the facts. Write for catalog.

•

IMMEDIATE SHIPMENT

•

DEALERS: Ask about our liberal dealer selling plan.

Costs Less per Year

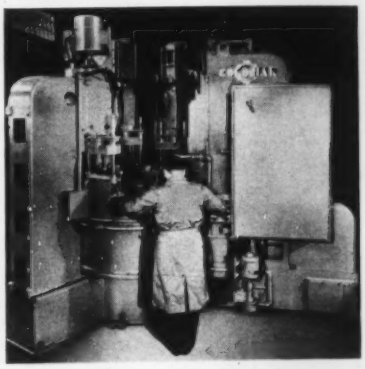
Look for this Mark of STERLING Quality

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Sterling WHEELBARROWS

A 7637-¼

NEW PRODUCTS and equipment



applicable to many automobile, aircraft, business machine and machine tool parts. *Write*: Colonial Broach & Machine Co., P.O. Box 37, Harper Station, Detroit 13, Mich. *Phone*: Jefferson 6-2550

Press Marks Parts

The S-4K will stamp up to twelve ⅛-in. characters into steel parts. The press is simple and safe to operate; the operator's attention is needed only for feeding the 8-station dial head.

Feeding is done at the front of the dial, a foot away from the ram. The press is tripped by a hand lever placed at a safe distance from the ram and dial.

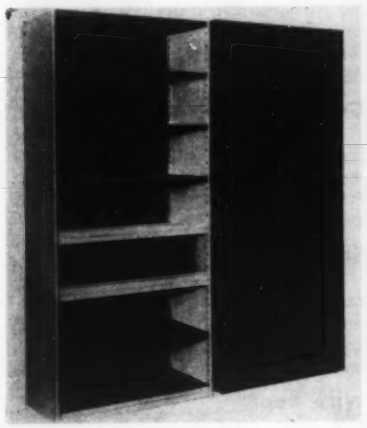
The press is easily converted for various stamping operations by applying interchangeable station

studs. *Write*: Department S, Geo. T. Schmidt Inc., 4100 Ravenswood Ave., Chicago 13, Ill. *Phone*: Eastgate 7-0300

Steel Shelving

Erectomatic has a locking device which holds each shelf firmly in place and provides maximum load carrying, yet allows each shelf to be removed or repositioned in seconds without the use of tools.

Shelves can be removed without tilting. This permits them to be repositioned without unloading. They can be spaced on 3-in. centers.



The full width and depth of each shelf can be used because there are no obstructions at either end.

Sizes: Depths, 12, 18 and 24 in. Widths, 24, 30, 36, 42 and 48 in. Heights, 39, 51, 63, 75, 87, 99 and 111 in. *Write*: Standard Pressed Steel Co., Jenkintown, Pa.

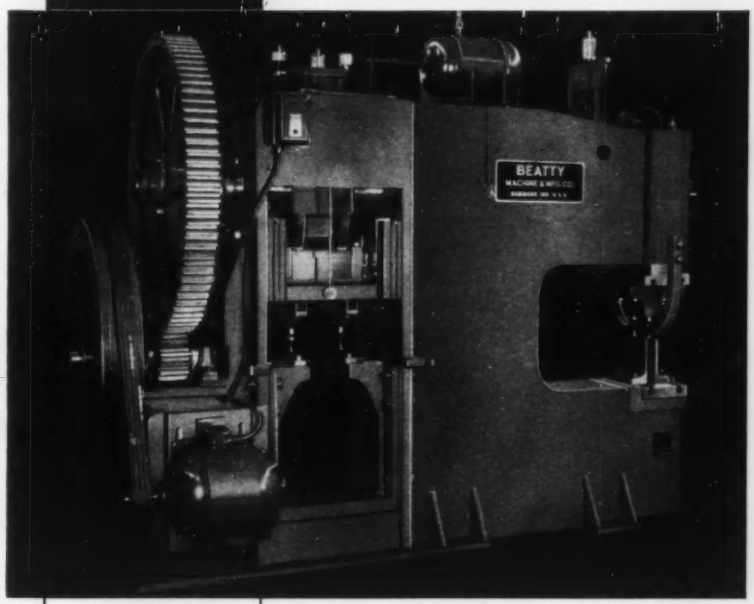
Lubrication Protection

Cyclesafe protects against the failure of forced feed lubrication systems. It automatically stops machinery when the lubrication pressure drops below a predetermined setting.

Tool, cutter, die or knife damage is eliminated because the machinery is allowed to complete its working cycle. The machinery cannot be restarted until the failure has been corrected and pressure restored. *Write*: Seneca Falls Machine Co., Seneca Falls, N. Y. *Phone*: 701

BEATTY
NO. 7 DETAIL BEAM PUNCH

New Detail Beam Punch Speeds Single-Hole Punching



Web Punch End One set single gag punch tools

Flange Punch End Two sets of single gag punch tools

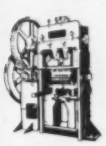
In just three passes, instead of the usual five, this Beatty Detail Beam Punch punches flanges on either side of the webs of beams, as well as webs of beams, angles, channels and plates — eliminates the end-for-end turning of beams.

Incorporating an entirely new design that speeds single-hole punching, this compact new punch saves floor space and reduces your equipment investment by handling the work of three ordinary machines. Mechanically driven, it is of 100-ton capacity, open-throat and guillotine type, and will punch up to a 1¼" hole through 1" mild steel.

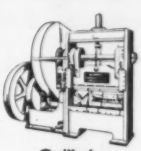
Write For Full Details

BEATTY
MACHINE & MFG. CO.

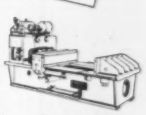
966 150th St.,
HAMMOND, IND.



Guillotine Beam (Flange) Punch



Guillotine Bar Shear



Horizontal Hydraulic Bulldozer

NEW literature

Write directly to the company for a copy

Blowers

A line of fans and ventilators is illustrated in this 4-page bulletin. General Blower Co., Morton Grove, Ill.

Hydraulic Valves

This 8-page bulletin covers a line of stock and special high pressure valves. R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa.

Corrosion Resistance

This 8-page bulletin describes the corrosion resistance provided by a process which diffuses chromium into the surface of steel parts. Chromalloy Corp., 450 Tarrytown Rd., White Plains, N. Y.

Tungsten Carbide

Characteristics of a tungsten carbide with a platinum binder for severe corrosion conditions are presented in a 2-page bulletin. Kennametal Inc., Latrobe, Pa.

Electrical Steel

This 56-page manual, P.O. 4856, presents test data on three types and five thicknesses of thin electrical steel. There are 39 pages of design curves, ranging from core loss to lamination factors. Product Information Service, Armco Steel Corp., Middletown, O.

Magnetic Shielding

Advantages and ways to fabricate magnetic shielding are given in bulletin 122, 10 pages. Magnetic Shield Division, Perfection Mica Co., 20 N. Wacker Dr., Chicago 6, Ill.

Stainless Tubing

Information on a seamless low nickel stainless tubing is given in bulletin 285, 3 pages. Bulletin 286, 4 pages, describes an austenitic steel used for corrosion resistance at high temperatures. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Firebrick

Fireclay and high alumina bricks for furnaces are described in bulletin 551, 8 pages. J. H. France Refractories Co., 1944 France Rd., Snow Shoe, Pa.

Carbide Die Sharpening

Bulletin 356, 8 pages, is a guide for the regrinding and maintenance of carbide dies. Oberg Mfg. Co. Inc., P.O. Drawer 231, Silverville Rd., Tarentum, Pa.

Servomotors

Electrical and mechanical specifications of standard and custom motors are presented in bulletin 385, 12 pages. Norden-Ketay Corp., Commerce Rd., Stamford, Conn.

Wire Rope

Bulletin 5702, 6 pages, lists wire rope specifications for all types of construction equipment and includes reeving diagrams. Public Relations Department, Macwhyte Co., Kenosha, Wis.

Conveyor Chains

Chains for conveyors used to move parts and containers varying from an aspirin to a TV set in size are specified in bulletin 56-60, 28 pages. Chain Belt Co., Milwaukee 1, Wis.

Monorail Tractor

This bulletin describes a tractor for use with monorail hand and electric hoists up to a capacity of 3 tons. Yale Materials Handling Division, Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa.

Electric Motors

Bulletin 102, 12 pages, is an application guide for 1/20 to 400-hp motors. Century Electric Co., 1806 Pine St., St. Louis 3, Mo.

Gears

Catalog 57 contains information on gear materials and heat treatment, cutting capacities, tooth forms, horse-

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CONTINENTAL CAN CO.

This 10-ton cab-operated *Cranemaster* is the first of two in service for Continental Can Co. Like so many other manufacturers, Continental Can Co. found Cranemasters *the top initial value* . . . with lasting satisfaction assured by Abell-Howe's years of experience in building overhead handling equipment that better *fills the bill* for industry of all kinds.

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First, you save on Abell-Howe low engineering and production costs! Then you save on operating costs because of *Cranemaster* speed and dependability... and the precise control you need for the most demanding lifting-loading jobs.

Send For Bulletin C-110

7747 Van Buren Street ABELL-HOWE COMPANY Forest Park, Illinois

NEW LITERATURE

power ratings and formulas, lubrication specifications and moments of inertia. Horsburgh & Scott Co., 5114 Hamilton Ave., Cleveland 14, O.

Automatic Chucker

A single spindle chucking automatic for the fast machining of large, complex workpieces in one operation is described in bulletin 5613, 4 pages. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

Tube Fittings

Catalog 4310, 52 pages, presents a line of brass, steel, stainless steel and aluminum flare tube fittings. Tube & Hose Fittings Division, Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, O.

Arc Cutting

Development and uses of an arc cutting process for nonferrous metals are detailed in bulletin ADE 880, 24 pages. Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York, N. Y.

Transfer Machines

A group of straight line transfer machines for automatic assembly operations is described in bulletin 401, 6 pages. Roller Gear Division, Ferguson Machine Corp., P.O. Box 5841, St. Louis 21, Mo.

Quenching Techniques

Tables, curves and charts in this 8-page bulletin, volume 7, No. 3, illustrate quenching media and temperature ranges. Surface Combustion Corp., Toledo 1, O.

Sheet Metal Machines

Bulletin 202, 20 pages, gives data on power operated machines for light sheet metal work. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Rotary Cutters

Countersinks, rotary files of various shapes, carbide ground cutters, end mills and grinding burrs are described in bulletin 601, 12 pages. M. A. Ford Mfg. Co. Inc., Davenport, Iowa.

Fluid Power Pumps

Bulletin 46601-B, 4 pages, describes a series of continuous pressure, constant displacement pumps. Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis.

Tool Steel

Analysis, heat treatment and forging practice of an oil hardening tool steel are covered by this 4-page bulletin. Joseph T. Ryerson & Son Inc., Box 8000-A, Chicago 80, Ill.

Milling Cutters

Bulletin 30-1B, 16 pages, covers a new line of inserted-blade cutters. Morse Twist Drill & Machine Co., New Bedford, Mass.

Fork Truck

An electric powered truck with a capacity of 3000 lb is described in this 4-page bulletin. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.

Steel Castings

This 20-page bulletin presents chemical and physical properties of steel castings. Dodge Steel Co., 6501 Tacony St., Philadelphia 35, Pa.

Zirconium

Technical data on zirconium are presented in this 4-page bulletin. Carborundum Metals Co., Akron, N. Y.

Expanding Jaw Mandrel

This 4-page bulletin describes step-jaw and straight-jaw mandrels. Erickson Tool Co., E. 23rd St. & Hamilton Ave., Cleveland 14, O.

Roller Chain

Bulletin 2454, 16 pages, describes bushed roller chains used in power transmission and conveyor service. Department PR, Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

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Regardless of whether your particular application requires One-Way Shut-Off, Two-Way Shut-Off, or Straight-Through Couplings – or Couplings for special service on fluid lines carrying oxygen, acetylene, gasoline, steam, etc. – you can always select a Hansen Coupling specifically engineered for your requirements.
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Manufacturers of motors, generators and other electrical equipment have relied for over 40 years on the consistently high quality of Acme-Newport silicon sheets. Now rolled exclusively from superior electric furnace steel, these sheets are always true to gage and size, easy to punch, unvarying in physical characteristics, constant in electrical properties. Add the advantage of this Company's convenient location on the Mississippi-Ohio River system, and you have a most reliable regular source for electrical steels. Contact Acme-Newport before you buy.

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

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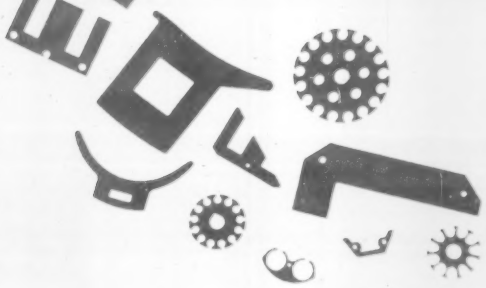


STEEL

March 4, 1957

Market Outlook

A STRENGTHENING in steel demand in May and June is a strong possibility. There are several signs.

In the Philadelphia and New York areas, some sellers of hot-rolled carbon steel bars think consumer inventory adjustments will have run their course by the end of April and that buying in May and June will be on the upgrade. Even now, business isn't bad. Steel warehouses in those areas saw the daily average of their February business equal, and in some cases exceed, January's daily average.

IMPROVEMENT—In the Boston area, cold-finished carbon steel bars, which have been lagging in demand, are picking up slightly for April delivery. Inquiries for forgings by several eastern arsenals (those at Watertown, Mass., Springfield, Mass., and Watervliet, N. Y.) are heavier. The New England area also saw a mild flurry in late buying of hot-rolled and cold-rolled carbon steel sheets for March delivery. Orders there for wire deliveries in March are slightly ahead of February's.

PICKUP—The Chicago area is seeing a modest pickup in agricultural implements. General manufacturing there is well sustained. Steel warehouses in the Chicago area report continuing good business. Approach of spring is quickening interest in building construction and is adding to the demand for reinforcing bars. At Seattle, order backlogs for reinforcing bars are substantial.

SOLD OUT—U. S. Steel Corp.'s National Tube Division has sold all its anticipated second quarter output of oil country tubing.

On the West Coast, most mills' second quarter order books are just about filled, and indications point to full books for the third.

WARNING—Sensing the possibility of a strengthening in demand for steel, the steel committee of the National Association of Purchasing Agents issued this warning to PAs: "Don't let your management talk you into a massive reduction in your steel inventory. If your inventory is heavy, a wise course would be to spread out the reduction over the next four months."

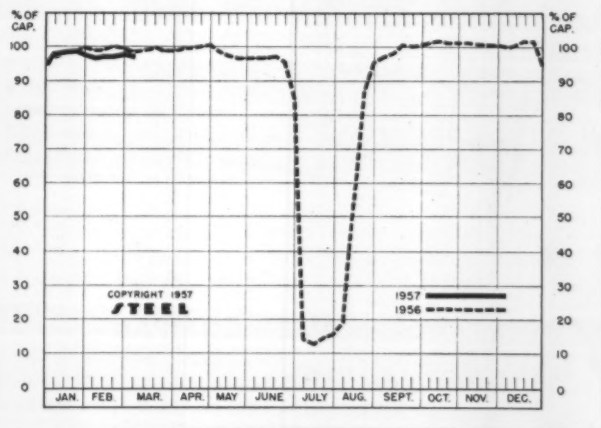
A suggestion of the advisability of keeping alert for an upturn in steel demand was made in STEEL, Feb. 18, p. 227.

GROWING—Highway construction is expanding as a good steel customer. In the Philadelphia and New York areas, highway work is showing more improvement, percentagewise as well as tonnagewise, than any other important line of construction. In the Chicago area, toll road and highway construction this year and next will keep pressure on structural shapes and plates.

HIGH OUTPUT—Steel ingot production continues at a high level, although it declined half a point in the week ended Mar. 3. This put the week's output at 97 per cent of capacity.

Ingot production in February was down slightly from what it was in that month a year ago—but only because February, 1957, had one less day than February, 1956. Output in February, 1957, was around 9,965,000 net tons. This makes the total production for the first two months of 1957 about the same as that in the comparable period of last year—20.9 million tons.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Mar. 3	Change	Same Week 1956	Same Week 1955
Pittsburgh	98	— 3*	102	90.5
Chicago	97	0	99.5	95
Mid-Atlantic	99.5	+ 1	100	87
Youngstown	98	— 6	97	92
Wheeling	101	0	97	96
Cleveland	95	— 2.5*	100.5	95.5
Buffalo	100	— 7.5	105	100
Birmingham	98	+ 2.5	95	86.5
New England	68	— 2	75	80
Cincinnati	93	+ 4	97.5	85.5
St. Louis	82	—16	106	96
Detroit	102.5	+ 0.5	97	87.5
Western	105	0	108	94
National Rate	97	— 0.5	98.5	90.5

INGOT PRODUCTION‡

	Week Ended Mar. 3	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	152.9†	155.9	155.5	153.1
NET TONS (In thousands)	2,456†	2,504	2,498	2,459

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 47

Technical Outlook—p. 93

Our business is staked on it

. . . will you try one heat on it?

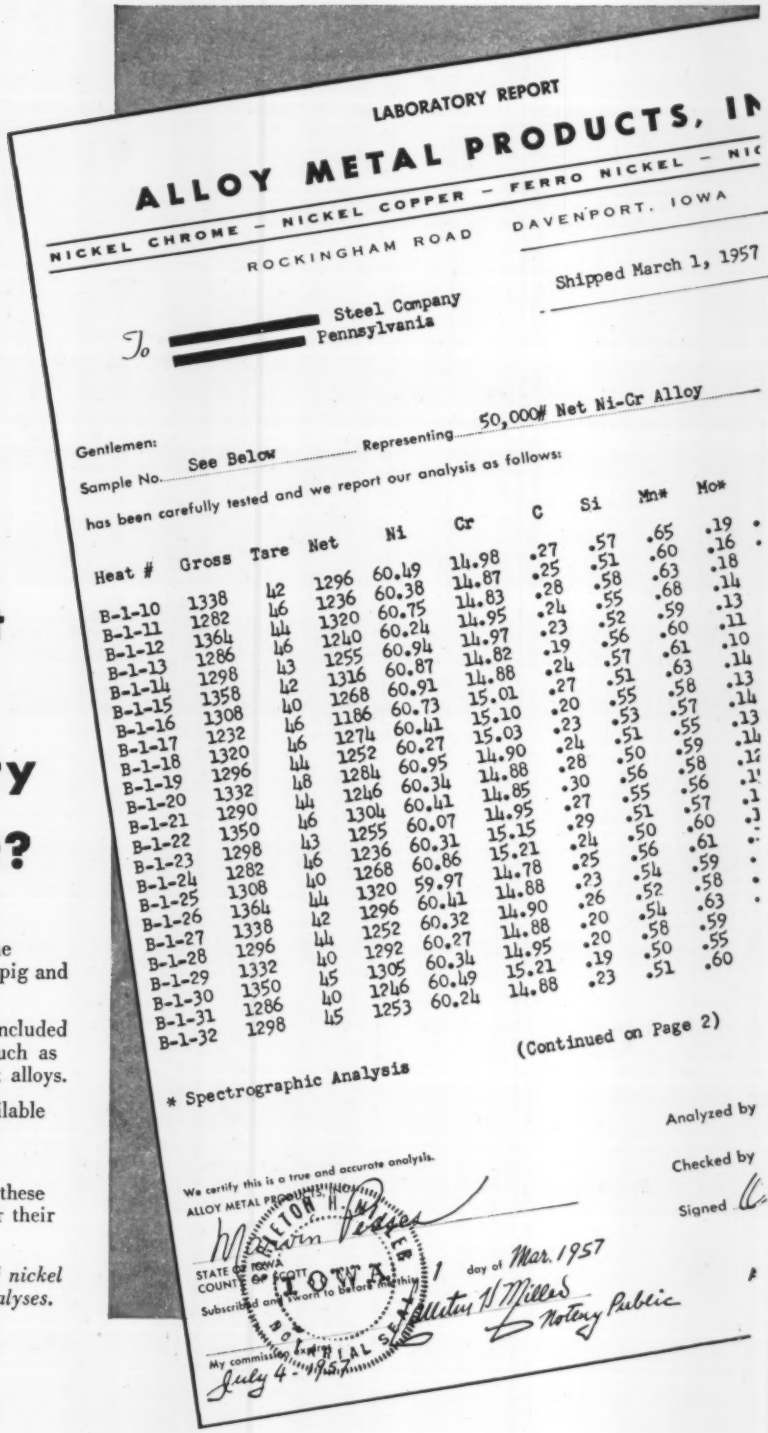
THIS IS OUR LABORATORY REPORT on one customer's order for Alloymet nickel base pig and shot* for stainless steel production.

It gives a complete analysis of *each heat* included in the total order. A notarized report such as this travels with every order of Alloymet alloys.

These alloys of certified analysis are available at approximately 5% over the cost of nickel alloy scrap.

Contact us now — discover why use of these alloying agents more than compensates for their slight premium in cost.

**Alloymet available in a complete range of nickel chrome, nickel iron and nickel copper analyses.*



LABORATORY REPORT

ALLOY METAL PRODUCTS, IN

NICKEL CHROME – NICKEL COPPER – FERRO NICKEL – NIC

ROCKINGHAM ROAD DAVENPORT, IOWA

To [redacted] Steel Company
Pennsylvania

Shipped March 1, 1957

Gentlemen:

Sample No. See Below Representing 50,000# Net Ni-Cr Alloy

has been carefully tested and we report our analysis as follows:

Heat #	Gross	Tare	Net	Ni	Cr	C	Si	Mn*	Mo*	
B-1-10	1338	42	1296	60.49	14.98	.27	.57	.65	.19	•
B-1-11	1282	46	1236	60.38	14.87	.25	.51	.60	.16	•
B-1-12	1364	44	1320	60.75	14.83	.28	.58	.63	.18	
B-1-13	1286	46	1240	60.24	14.95	.24	.55	.68	.14	
B-1-14	1298	43	1255	60.94	14.97	.23	.52	.59	.13	
B-1-15	1358	42	1316	60.87	14.82	.19	.56	.60	.11	
B-1-16	1308	40	1268	60.91	14.88	.24	.57	.61	.10	
B-1-17	1232	46	1186	60.73	15.01	.27	.51	.63	.14	
B-1-18	1320	46	1274	60.41	15.10	.20	.55	.58	.13	
B-1-19	1296	44	1252	60.27	15.03	.23	.53	.57	.14	
B-1-20	1332	48	1284	60.95	14.90	.24	.51	.55	.13	
B-1-21	1290	44	1246	60.34	14.88	.28	.50	.59	.14	
B-1-22	1350	46	1304	60.41	14.85	.30	.56	.58	.12	
B-1-23	1298	43	1255	60.07	14.95	.27	.55	.56	.1	
B-1-24	1282	46	1236	60.31	15.15	.29	.51	.57	.1	
B-1-25	1308	40	1268	60.86	15.21	.24	.50	.60	.1	
B-1-26	1364	44	1320	59.97	14.78	.25	.56	.61	.1	
B-1-27	1338	42	1296	60.41	14.88	.23	.54	.59	.1	
B-1-28	1296	44	1252	60.32	14.90	.26	.52	.58	.1	
B-1-29	1332	40	1292	60.27	14.88	.20	.54	.63	.1	
B-1-30	1350	45	1305	60.34	14.95	.20	.58	.59	.1	
B-1-31	1286	40	1246	60.49	15.21	.19	.50	.55	.1	
B-1-32	1298	45	1253	60.24	14.88	.23	.51	.60	.1	

(Continued on Page 2)

* Spectrographic Analysis

Analyzed by

Checked by

We certify this is a true and accurate analysis.
ALLOY METAL PRODUCTS, INC.

Signed

STATE OF IOWA
COUNTY OF SCOTT

Subscribed and sworn to before me this 1 day of Mar. 1957

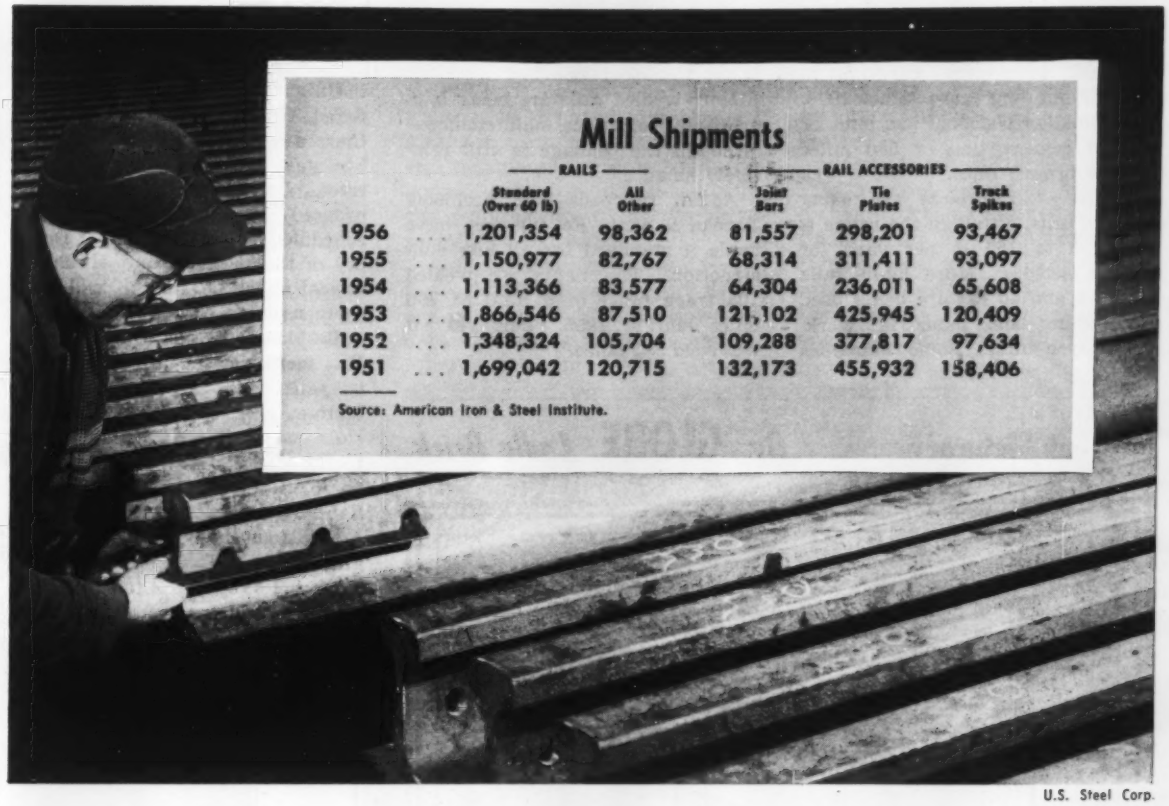
Notary Public

My commission expires July 4 - 1957

NOTARIAL SEAL IOWA

ALLOY METAL PRODUCTS, Inc.
PHONE 6-2561 • TELETYPE DV 588
(FORMERLY A DIVISION OF **ALTER COMPANY**)
ROCKINGHAM ROAD
DAVENPORT, IOWA

World's largest producer of secondary nickel alloys of certified analysis



Mill Shipments

	RAILS		RAIL ACCESSORIES		
	Standard (Over 60 lb)	All Other	Joint Bars	Tie Plates	Track Spikes
1956	1,201,354	98,362	81,557	298,201	93,467
1955	1,150,977	82,767	68,314	311,411	93,097
1954	1,113,366	83,577	64,304	236,011	65,608
1953	1,866,546	87,510	121,102	425,945	120,409
1952	1,348,324	105,704	109,288	377,817	97,634
1951	1,699,042	120,715	132,173	455,932	158,406

Source: American Iron & Steel Institute.

U.S. Steel Corp.

Better Year for Rails

Carriers' plans for greater capital expenditures and an increase in track maintenance needs indicate a gain in sales of railway track materials during '57

RAIL sellers are optimistic. They think shipments this year will be higher than they were in 1956, although maybe not by much. One industry leader confidently predicts a gain of 5 to 10 per cent in the first half.

Car loadings and the money situation will affect the trend in the second half. If shipments hold up then, 1957 will be the fourth successive year in which at least a slight increase has been made—although the average (see table) is well below that of the preceding four years.

Replacements — Rail replacements last year were lighter than expected, largely because the steel strike interfered with shipments of new rails when they were needed for laying. Despite this disruption, shipments of light and heavy rails in 1956 increased slightly over the 1955 performance.

Moved were 1,201,354 net tons of standard rails, weighing over 60 lb per yard, and 98,362 tons of rails 60 lb and lighter. This compares with 1,150,977 and 82,767 tons in 1955.

Railroad circles estimate last year's replacements were lower than shipments, but by how much is a question. Some producers believe this carry-over will not check a further increase in shipments this year.

Accessories—Sales of joint bars, tie plates and track spikes have been edging upward over the last three years, and will likely follow rail shipment this year. Last year, shipments of accessories totaled 473,225 tons, versus 472,822 tons in 1955 and 365,923 tons in 1954.

The drop in export shipments the last few years seems of little concern to producers, apparently because they can make more profitable use of semifinished steel by meeting domestic needs. Foreign shipments hit a peak 173,351 tons (over 60-lb rails) in 1953, dropped to 72,743 tons in 1954, then went down to 40,474 tons in 1955 and 23,637 tons in the first 11 months of last year.

Rail Uses — Maintenance is the principal use of rails in this country. No important new lines are being built. In fact, over-all mileage of operated track is declining slowly. Railroads are seeking to lop off unprofitable branch lines and are reducing some track through the use of centralized traffic control (C.T.C.).

Two tracks instead of four are being used on the 163-mile Cleveland to Buffalo stretch of the New York Central. Other carriers are replacing two tracks with one.

The accelerated development of

Canada's natural resources, particularly iron ore, nickel and other minerals, has spurred a revival in railroad building there. Since 1946, the Canadian National has built or started construction of 580 miles of new branch lines.

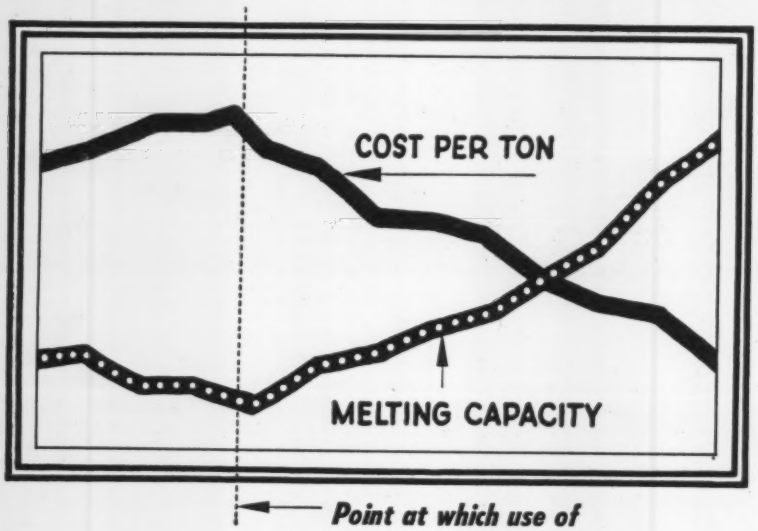
Trend — Railroads are using heavier rails, although the range is still 115 to 155 lb per yard for carrier service. More 60-lb rails (less 30 and 40 lb) are being used for mining and industrial work.

For open mining, some companies are going as high as 80 and 85 lb. They are using heavier cars and faster transportation.

More welded rails are being laid, primarily to reduce maintenance—although the tonnage is still relatively small.

A few railroads—the Atchison, Topeka & Santa Fe, for one—have made it standard for all new construction. The Santa Fe welded 103 track miles of a total of 266 miles laid in 1955. This year it will weld 285 miles.

A Great Picture ***By* GLOBE *Ladle Brick***



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Rails, Cars . . .

Track Material Prices, Page 165

Union Pacific Railroad has ordered from the General Electric Co. a second group of fifteen 8500-hp gas turbine-electric locomotives. Delivery on the first group, ordered in November, 1955, is scheduled to start in July. Delivery of the second group, estimated to cost about $15 million, will start early next year.

Bethlehem Steel Co., Bethlehem, Pa., increased its mill base prices on rails and track accessories effective Feb. 26. Standard tee rails were raised $4 a ton to $5.275 per 100 lb; joint bars, $5 to $6.60; tie plates, $5 to $6.275; light tee rails, $5 to $6.25.

Revisions also were made on girder rails, now quoted at $6.80; track bolts, up $15 a ton to $13.85 per 100 lb; track spikes, up $9 a ton to $9.225 per 100 lb. Screw spikes are now quoted at $13.60.

The net result of the increases is said to be less than 4 per cent.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 162 & 163

Inquiry for hot and cold-rolled sheets coasts, with buyers holding purchases close to consumption. Consumers are specifying requirements for shorter periods since there is no need for them to commit themselves far ahead.

Normal lead time for April tonnage has passed, but second quarter ordering has been slow except for a mild flurry, notably in New England, for March tonnage. In the Midwest, April tonnage is pretty well booked up, but May requirements cannot be appraised until after Mar. 15 when lead time for that month expires.

The decline in hot-rolled sales is less pronounced, but not much change is noted in demand for cold rolled. Some sellers think once inventory adjustments are completed, a pickup in buying will be experienced. However, inventory adjustment is likely to continue another two months or so unless a spurt in consumption develops. So far, the approach of spring has failed to stimulate demand for galvanized sheets.

Automotive and household appliance industries' requirements are being watched closely. Following

reports of cutbacks in auto production, several Pittsburgh sales managers predict auto ordering of cold-rolled sheets and strip will decline gradually in the second quarter. Hot rolled will hold steady. More strip-sheet mills are turning out light gage plates, to maintain mill operations close to 100 per cent of capacity despite lagging sheet business.

Appliance requirements continue to lag. Last week, Westinghouse Electric Corp.'s Appliance Division began a gradual cutback in employment at its Mansfield, O., plant in a move aimed at balancing inventories. The plant turns out laundry equipment, electric ranges and a variety of portable appliances.

Prices continue to rise. Last week various producers announced increases ranging up to $6 a ton on cold-rolled spring steel strip. U.S. Steel Corp. applied new size extras on alloy sheets and strip, effective Feb. 23.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 161

Approach of spring is quickening interest in construction and is adding to the work volume of reinforcing steel bar suppliers. Considerable construction, including many bridges, has been switched to reinforced concrete construction over recent months because of tight supply conditions in the structural steel market.

Bar mills in the Pacific Northwest are in receipt of a fair volume of small tonnages, and they are holding substantial order backlogs despite the absence of large individual lots.

Steel Bars . . .

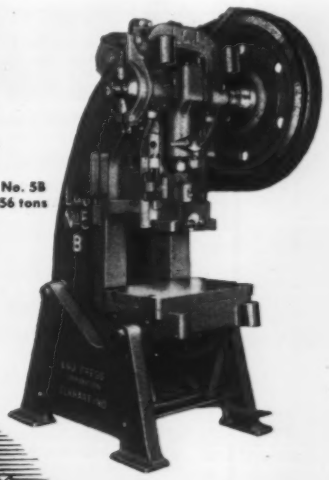
Bar Prices, Page 161

Something of a mixed situation prevails in the bar market. Moderate gains in sales of hot-rolled bars to the agricultural equipment makers and machine tool builders are reported at Pittsburgh, but demand for cold-drawn bars continues to decline. Automotive and textile equipment buyers continue to order cautiously.

At Chicago, some barmakers say demand is holding up surprisingly well. Current and next quarter rolling cycles are well filled. Demand for leaded steels in that area is excellent. Hot-rolled carbon bar volume is better than expected in the light of continued lagging automotive demand. A modest pickup in farm implement and general manufacturing demands is reported, though sluggish automotive requirements are holding down cold-drawn bar sales.

A slight improvement in demand for cold-drawn bars for April delivery is noted at Boston. However, a like pickup is not being experienced in hot-rolled or alloy bars. Buying by converters and forge shops in the area lags, though inquiries for forgings by several eastern arsenals are reported heavier, including Watertown, Springfield and Watervliet, N. Y.

In general, sellers of hot-rolled carbon bars think demand will continue on the easy side into April. By that time, it is thought that inventory adjustments will have run their course and buying in May and June should be on the upgrade.



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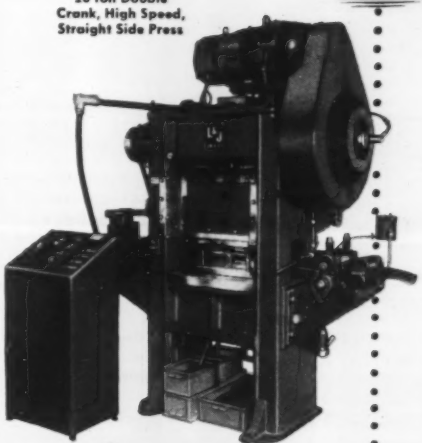

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Large flats continue in strongest demand at the moment.

Prices continue to rise, chiefly through upward adjustments in extras. Youngstown Sheet & Tube increased alloy grade extras on cold finished alloy bars, effective Feb. 25. Republic Steel Corp. took similar action effective Feb. 22.

Higher quality extras are causing changes in the buying patterns of some consumers.

Enlargement of its Seattle plant has been announced by the Sierra Drawn Steel Corp., Los Angeles, to provide facilities for the production of cold-drawn bars.

Plates . . .

Plate Prices, Page 161

Light plate supply is a little easier because of increased production at strip mills, but there is nothing in the market situation to suggest any diminution in demand, especially for the heavy plates. In the case of the higher gages, supplies still fall short of requirements.

Strip plate producers are filling more of the requirements of the railroads and shipyards. Construction firms are still encountering difficulty in getting assurances on plate supplies to support their projected operations this coming summer.

Low alloy, high tensile plates are generally sold out through the second quarter. Defense set-asides for the third quarter will be up substantially with some mills. This tightness in high-tensile applies to all sizes. There is no noticeable easing in the light gages and narrow widths, under 60 in., as in the case of carbon plates. Defense volume, in the case of some mills, accounts for close to 20 per cent of their total tonnage. Clad steel deliveries average around 14 weeks.

New England tank shops are getting more light gage tonnage. As a result, they are stepping up their operations.

Several military projects in Alaska, involving storage tanks, will come out for bids this month in the Pacific Northwest market.

The 120-in. plate mill of the Colorado Fuel & Iron Corp. at Claymont, Del., which went down Feb. 9 for installation of a new housing, was scheduled to resume operations Mar. 1.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 165

Producers of rivets are increasing their prices to reflect recent advances in extra charges on steel bars and wire. Some makers put the higher prices into effect Feb. 21, others Feb. 25.

Under the new schedule, large rivets, ½-in. in diameter and up, were raised to $11.50 from $10.85 per 100 lb. On small rivets, 7/16-in. and smaller, discounts were lowered to 23 per cent off list from 26.5 per cent.

W. Germany Steel Output Up

Production of pig iron in Western Germany last year totaled 19,360,000 net tons, an increase of 1,229,800 tons over the 18,130,200 tons produced in 1955. Output of steel during the year was 25,509,000 net tons, up 2,039,400 tons from the 23,469,600 produced in 1955.

Shipments of rolling mill products in 1956 amounted to 16,907,-

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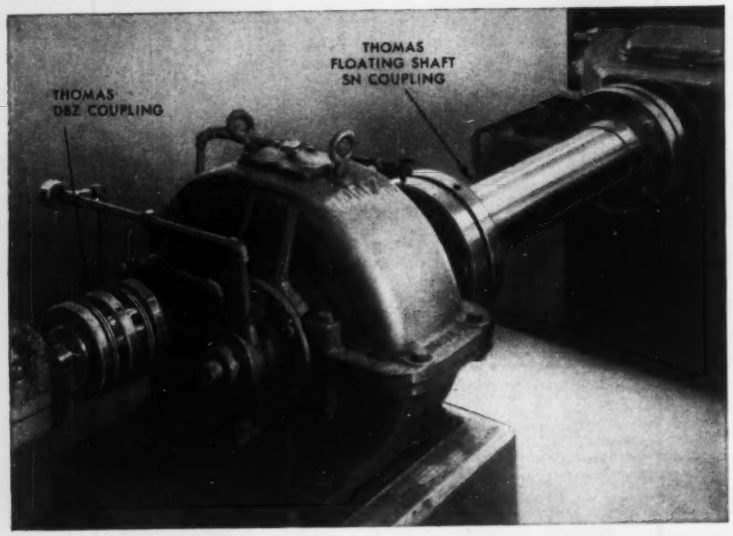

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990 net tons, up 1,639,550 tons from the 15,268,440 shipped in the preceding year.

Large scrap exports were made in 1956, mainly to steel pool countries from which imports declined. In fact, 149,600 net tons are shown as an export balance in 1956, against an import balance of 551,000 in the preceding year. Germany was a leading supplier of scrap to steel pool countries though she needs imports herself.

Warehouse . . .

Warehouse Prices, Page 166

Distributors are working out new price schedules for cold-finished bars to cover extras recently put into effect by producers. The practice of quoting a base price on hot-rolled merchant bars and adding the required extras for special quality has been adopted by practically all warehouses.

On a daily basis, warehouse business in February was comparable with January's, possibly a shade better. While sales of flat-rolled products declined, those of other products increased, notably those used in construction and including light plates and reinforcing bars. Bookings of plates and shapes were restricted by tight supplies.

Wire . . .

Wire Prices, Pages 163 & 164

Seasonal quickening in demand for merchant wire products is putting a little more life into that division of the market, but gains to date are disappointing. Mills are not being pressed for shipments as they have been in past years. In the East, for example, sellers say volume lags despite the approach of spring.

The continued sluggishness in the merchant items is thought to reflect cautious inventory building of jobbers in the farm areas.

Manufacturers wire is moving steadily into consumption, but the mills have open spaces in their schedules. A pickup in forward buying by automotive consumers would go a long way toward stimulating demand from other consuming lines, it is thought.

March orders are ahead of February's in New England. Buying for second quarter is slow, however, notably heading wire and spring grades. Mesh volume is somewhat heavier; also highway rail strand. More states are making advance payment on highway fabric, permitting storage on job sites by contractors.

Seasonal pickup in demand for merchant wire products is noted in the Midwest. Mills are taking orders for second quarter delivery in good volume. Manufacturers wire trade continues disappointing. Upholstery wire is fairly active, but requirements for furniture wire are spotty. Pickup in demand for welded wire fabric and reinforcing mesh is expected as road building revives seasonally.

Tennessee Coal & Iron Division, U.S. Steel Corp., is installing facilities at its Fairfield Works, Birmingham, for the production of welded wire mesh. The division has served as the southern sales and distribution agent for its sister division, American Steel & Wire.

The new equipment includes

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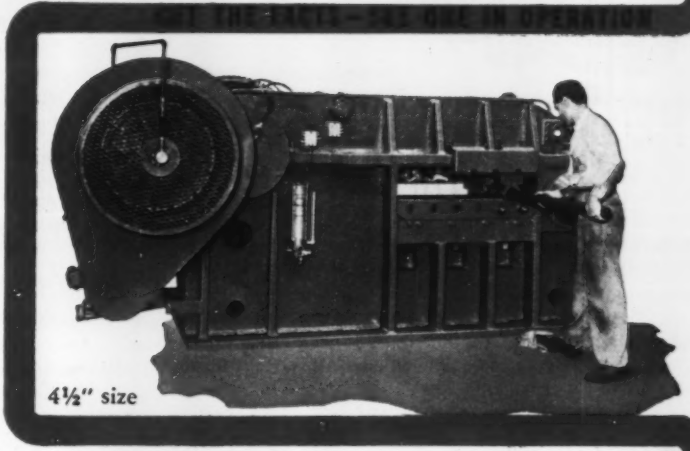

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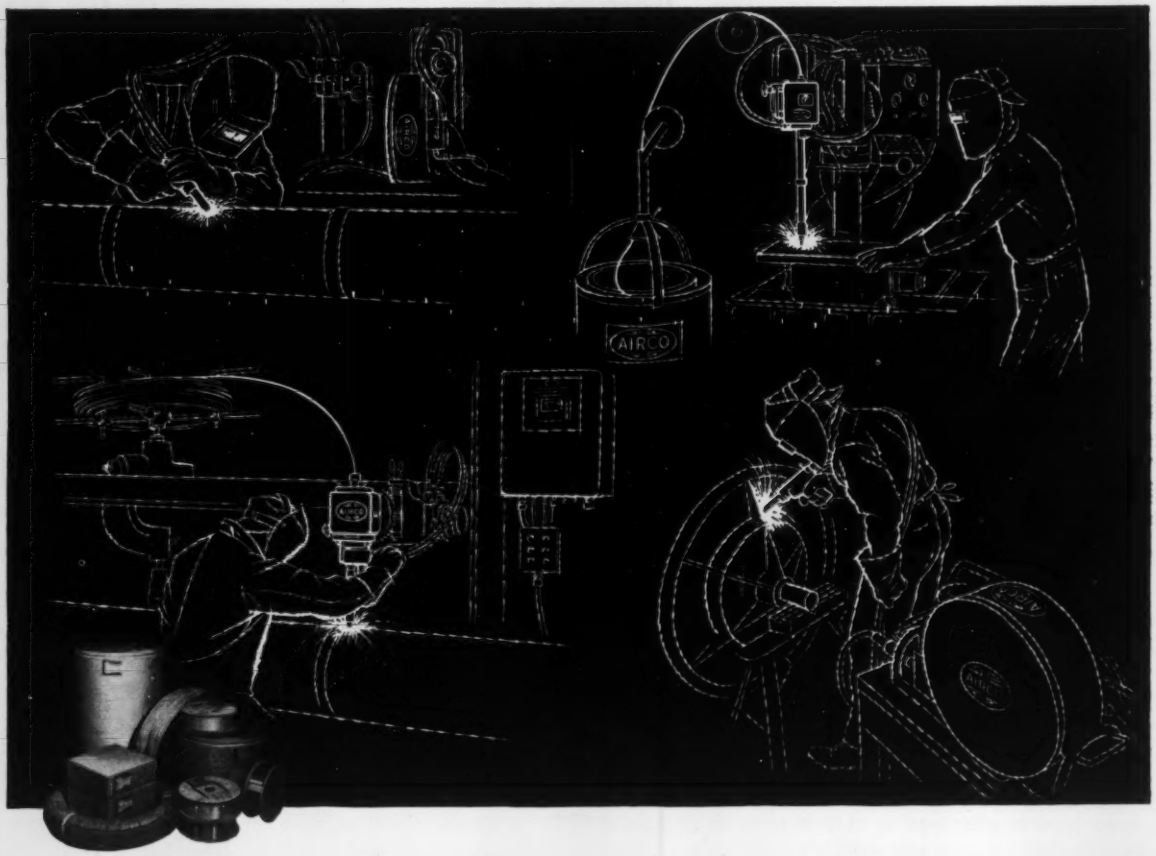

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two 156-in. fabric welding machines and auxiliary equipment. The electric welding machines will have a combined annual capacity of nearly 18,000 tons. Production is scheduled to start in the third quarter.

A contract for 18,816,000 linear feet of steel wire strand has been awarded Bethlehem Steel Co., Bethlehem, Pa., at $620,928 by Corps of Engineers, Memphis, Tenn.

Tubular Goods . . .

Tubular Goods Prices, Page 165

A major Pittsburgh area producer of oil country tubing says it has sold out all its anticipated second quarter production. Orders came in as quickly as books were opened for the period.

With another record well drilling season in prospect, users of oil country tubing and specialties that have not covered their second quarter needs may run into supply dificulties before long.

Softening in demand for buttweld standard pipe continues. To a considerable extent, this reflects the seasonal slack in building. Pipemakers think resumption of active housing construction will be accompanied by a spurt in demand for pipe.

Considerable cast iron pipe business is expected to come out for bids in the Pacific Northwest shortly. Currently, some small lots are being sold by distributors in the area. Bids are in at Port Angeles, Wash., on 180 tons of 6 to 16 in. pipe.

On seamless pipe, 12 in. and under, shipments are 30 days and more behind schedule. Some tie-in sales of seamless with buttweld pipe are reported. Hot-rolled pressure tubing is sold out through the second quarter in some cases.

Utilities are asking for more tonnage next quarter. On electric-weld line pipe, 24 in. and over, the mills are booked into 1960.

Buttweld pipe demand is slow in the Midwest. Mill backlogs are not up to normal for this season at some production points. Some can ship tonnage in three to four weeks. But production hasn't slowed up. Sellers anticipate a sharp pickup in ordering as construction and building operations rise seasonally.

Iron Ore . . .

Iron Ore Prices, Page 167

Steep Rock Iron Mines Ltd. shipped 3,317,073 tons of high grade iron ore last year, 1 million more than it did in 1955. Expectations are 1957 production will be even better. The target is 3.5 million tons.

According to M. S. Fotheringham, president of Steep Rock, the annual capacity of the Steep Rock range (near Atikokan, Ont.), combined with production from an ore body under lease to Inland Steel Co., Chicago, can conceivably reach 10 million tons.

Over the next ten years, the company anticipates sales of about 48 million tons of ore. (Gross value at current prices would be $557 million.)

Iron ore transportation rates from upper lake U.S. ports to lower lake ports will be higher in the 1957 lake navigation season. The Duluth to lower lake ports rate has been hiked about 5.25 per cent to $2 a gross ton. Last week, a leading vessel operator announced that the new rate from Port Arthur, Ont., to lower lake ports would be $1.875 per gross ton. Last year it was $1.78.

Structural Shapes . . .

Structural Shape Prices, Page 161

Competition among the structural steel fabricating shops is the keenest it has been in months, reflecting continued easing in fabricators' order backlogs. Although considerable work is reported to be on architects' drawing boards, it is coming out slowly.

While fabricators anticipate considerable activity over the months immediately ahead, they are not as optimistic as they were a little earlier this year, particularly with respect to commercial and industrial projects.

Currently, highway work is showing more improvement, percentagewise as well as tonnage-

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INLAND STEEL IS SAVING approx. 125 MAN HOURS EACH MONTH on JUST ONE SPECIFIC REQUIREMENT

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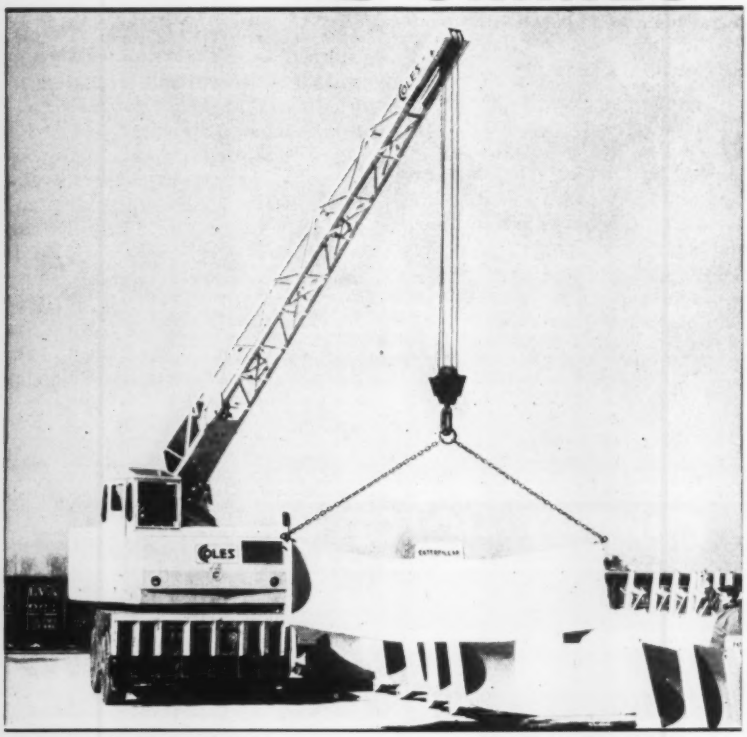

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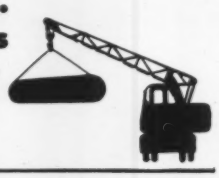

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wise, than any other important line of construction.

With the possible exception of standard structurals, fabricating shops and warehouses are not building their hopes too high for additional plain material supplies in the second quarter. Any improvement in supply will be spotty, it is thought, and shops are gearing their operating schedules and bookings accordingly.

Most smaller fabricators are reluctant to go beyond six months on firm commitments. Higher costs are being passed on, and another increase early in the third quarter is expected. Despite peak building costs, most private industrial and commercial projects are reported going ahead in New England.

If shipments of heavy structurals are to increase 20 per cent this year (as estimated), substantially heavier tonnage will have to come from new rolling capacity in the second half.

Washington state takes bids Mar. 26 on the proposed Washington Narrows bridge, involving 1000 tons. Bids also open Mar. 8 for 1090 tons for the Rocky Reach power house at Wenatchee, Wash.

A lumber dealer-contractor in Batesville, Ind., has devised a new way of using junior beams in a flooring system for home construction. The system utilizes nine 8-in. beams which span the entire width of the foundation. Supported in the center by a bearing wall, they are 24 ft long. The beams are spaced 4 ft apart and are braced with lightweight steel bridging. The ends of the beams are embedded in mortar in the concrete foundation block.

Metallurgical Coke . . .

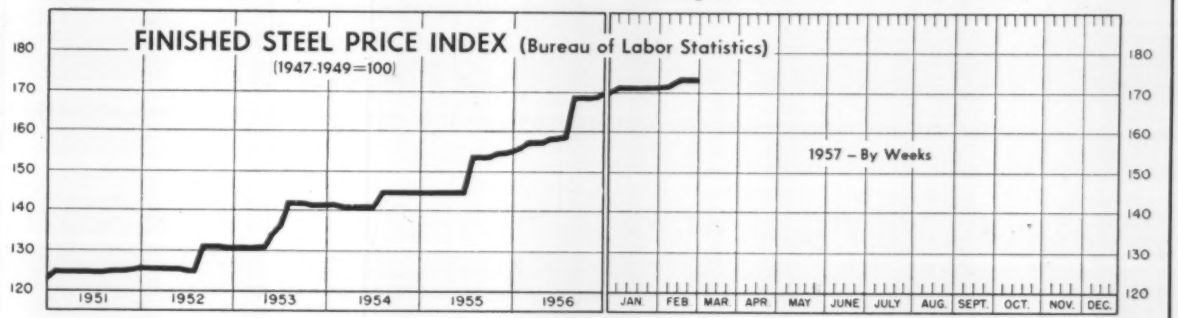
Metallurgical Coke Prices, Page 167

Beehive coke ovens in the Connellsville, Pa., area continue to operate at a good rate. But there is no need at present to bring additional ovens into operation.

Some by-product ovens that have operated at capacity for a long time are being closed down for repairs. This may mean greater dependence on beehive coke for a time.

Strong demand for coke continues. But needs may taper in the second and third quarters.

Price Indexes and Composites



Feb. 26, 1957	Week Ago	Month Ago	Feb. Avg.	Year Ago
173.4	173.4	171.7	173.0	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.217	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.650	Bars, C.F., Carbon	9.850
Tie Plates	6.108	Bars, C.F., Alloy	13.463
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.667	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 303 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	6.075	Pipe, Galv, Buttweld (100 ft)	23.034
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.566
		Casing, Oil Well, Alloy (100 ft)	288.980
		Tubes, Boiler (100 ft)	45.670
		Tubing, Mechanical, Carbon (100 ft)	23.367
		Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
		Tin Plate, Hot-dipped, 1.25 lb	9.433
		Tin Plate, Electrolytic, 0.25 lb	8.133
		Black Plate, Canmaking Quality	7.233
		Wire, Drawn, Carbon	9.475
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.213
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 27 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	227.10	227.10	225.92	209.10	171.92
Index in cents per lb	6.152	6.152	6.111	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$139.60	$139.60	$137.98	$128.02	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	52.50	52.83	56.00	48.17	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Feb. 27 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.365	5.365	5.365	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton

	Feb. 27 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld., Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, NevilleIsland,Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld., Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne.	255.00†	255.00†	255.00†	205.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$53.50	$53.50	$54.50	$47.50	$44.00
No. 1 Heavy Melt, E. Pa.	56.50	57.00	59.00	50.00	42.50
No. 1 Heavy Melt, Chicago	47.50	48.00	54.50	47.00	42.50
No. 1 Heavy Melt, Valley	52.50	53.50	56.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	50.50	51.50	53.50	49.50	43.00
No. 1 Heavy Melt, Buffalo	53.50	53.50	59.50	46.50	43.00
Rails, Rerolling, Chicago	63.50	64.50	71.50	65.50	52.50
No. 1 Cast, Chicago	45.50	45.50	48.50	46.50	49.00

COKE, Net Ton

Beehive, Furn, Connisvl.	$15.25	$15.25	$15.00	$14.125	$14.75
Beehive, Fdry, Connisvl.	18.00	18.00	18.00	16.50	17.50

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1000 tons, shop repair addition, Hartford Research Center, Middletown, Conn., to the Grand Iron Works, New York (direct government contract); Davison Construction Co. Inc., Manchester, N. H., general contractor; 50 tons, reinforcing, Fabricated Steel Products Co., Boston.

500 tons or more, seven-story office building, Southern New England Telephone Co., Bridgeport, Conn., to Topper & Griggs Bethlehem Fabricators Inc.), Hartford, Conn.; E. & F. Construction Co., Bridgeport, general contractor.

400 tons, Seattle light plant, north end service facility, to Isaacson Iron Works, Seattle; John H. Sellen Construction Co., Seattle, general contractor.

300 tons, structurals and bars, library, University of New Hampshire, Durham, N. H., to the Lyons Iron Works, Manchester, N. H., and Bethlehem Steel Co., Bethlehem, Pa.; Harvey Construction Co. Inc., Manchester, general contractor.

230 tons, high school, Rockland, Mass., to the Groisser & Shlager Iron Works, Somerville, Mass.; Tornabene Bros. Co., Newton Upper Falls, Mass., general contractor; 40 tons, reinforcing, Northern Steel Co., Boston.

160 tons, regional high school, West Newbury, Mass., to the Groisser & Shlager Iron Works, Somerville, Mass.; G. L. Rugo & Sons Inc., Boston, general contractor.

125 tons, structurals and bars, laboratory and test cells, United Aircraft Corp., East Hartford, Conn., to the Standard Structural Steel Co., Hartford, Conn., and the Bethlehem Steel Co., Bethlehem, Pa. (bars); Standard Builders Inc., Hartford, is general contractor.

105 tons, including bars, state highway bridge, Marion-Wareham, Mass., to the Tower Iron Works, Providence, R. I.; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor; reinforcing, Bethlehem Steel Co., Bethlehem, Pa.

80 tons or more, government hospital, Mountain Home, Idaho, to the Gate City Iron Works, Boise, Idaho.

73 tons, Ice Harbor power project bridge, to the Bethlehem Pacific Coast Steel Corp., Seattle.

STRUCTURAL STEEL PENDING

5700 tons, bridge, Summit, Del., Army Corps of Engineers, Philadelphia; plans issued, with bids Mar. 19.

3500 tons, state bridge, Schuylkill river, Pennsylvania boulevard, Philadelphia; Buckley & Co., that city, is low on the general contract.

2184 tons, superstructure of tri-level bridge N8-10, Northern Illinois toll highway contract SN-8, Leydon township, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar. 14.

2011 tons, one of two state bridge programs in Montgomery county, Pa.; bids Mar. 22; also required 1037 tons of reinforcing bars.

1900 tons, piers and superstructures, three viaducts, George Washington Memorial parkway, Arlington county, Va.; bids Mar. 7, Bureau of Public Roads, Washington; also 450 tons, reinforcing bars.

1700 tons, bridges, Northern Illinois toll highway contract N-7B, Elk Grove and Leyden townships, Cook county, Ill., for Illinois State Toll Highway Commission, Chicago; bids March 7.

1440 tons, one of two state bridge programs in Montgomery county, Pa.; bids Mar. 22; also required are 679 tons of reinforcing bars.

1411 tons, superstructure of tri-level bridge T6-5, Northern Illinois toll highway contract ST-6, Proviso township, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar. 14.

1000 tons plus, Washington state, Washington Burrows bridge, Kitsap county; bids to Olympia, Wash., Mar. 26.

724 tons, state bridge work, Lehigh county, Pa.; bids readvertised for Mar. 22; also required are 327 tons of reinforcing bars.

271 tons, state bridge work, Passaic county, N. J.; bids Mar. 12; also required are 190 tons of reinforcing bars.

171 tons, state bridge, Butler county, Pa.; bids Mar. 22.

116 tons, state bridge, Luzerne county, Pa.; bids Mar. 22.

100 tons or more, two fixed gate hoists, Rock Island spillway; Berger Engineering Co., Seattle, low at $58,086, to the Chelan County PUD No. 1, Wenatchee, Wash.

35 tons, also steel piling and other items, Bonanza Channel bridge, Nome, Alaska; bids to the Federal Supply Service, Seattle, Feb. 26.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1400 tons, state office building, Baltimore, to the Thompson Steel Co., Baltimore; Blake Construction Co., Baltimore, general contractor.

520 tons, office building, Dorr-Oliver Inc., Stamford, Conn., to the Capital Steel Co., New York; DeLuca Construction Co., Glenbrook, Conn., general contractor; structurals, Port Chester Iron Works.

325 tons, storage building and facilities, Otis AFB, Falmouth, Mass., to the Bethlehem Steel Co., Bethlehem, Pa.; Theodore Loranger & Sons Co., New Bedford, Mass., general contractor; 50 tons, structurals, to the Providence Steel & Iron Co., Providence, R.I.

300 tons, or more, office building, Seaboard Airlines Railroad, Richmond, Va., to the Virginia Steel Co. Inc., Richmond; Doyle & Russell, Richmond, general contractor; structurals to the Liphart Steel Co. Inc.

215 tons, women's dormitory, University of Florida, Gainesville, Fla., to the Virginia Steel Co., Richmond, Va.; Ruscon Construction Co., Jacksonville, Fla., general contractor; structurals, Savannah Iron Works, Savannah, Ga.

175 tons, including 92 tons of bar joists, regional high school, West Newbury, Mass., to the Bethlehem Steel Co., Bethlehem, Pa.; G. L. Rugo & Sons Inc., Boston, general contractor.

100 tons, including structurals, toll stations, Connecticut turnpike, Connecticut, to the Scherer Steel Co., Hartford, Conn., and City Iron Works, Hartford (structurals); Associated Construction Co., Hartford, general contractor.

57 tons, Washington state bridge, to the Bethlehem Pacific Coast Steel Corp., Seattle; P. J. Anderson, Seattle, general contractor.

Unstated tonnage, Bell Telephone Exchange, Laurel Springs, Pa., through Irwin & Leighton, general contractor, Philadelphia, to the Concrete Steel Co., that city.

REINFORCING BARS PENDING

1200 tons, Northern Illinois toll highway contract N-7B, including erection of precast concrete bridges, Elk Grove and Leyden townships, Cook county, Ill., for Illinois State Toll Highway Commission, Chicago; bids March 7.

1037 tons, one of two state bridge programs in Montgomery county, Pa.; bids Mar. 22; also required are 2011 tons of structurals.

650 tons, 2.45 miles of Tri-state route, Northern Illinois toll highway contract T-2C, including erection of precast concrete bridges, Worth and Palos townships, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar 21.

970 tons, 2.29 miles of highway, Northern Illinois toll highway contract T-9A, including erection of precast concrete bridges, Maine township, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar. 14.

679 tons, one of two state bridges, Montgomery county, Pa.; bids Mar. 22; also required are 1440 tons of structurals.

630 tons, 5.27 miles of highway, Northern Illinois toll highway contract E-1C, including erection of precast concrete bridges, Aurora township, Kane county, Ill., and Naperville township, DuPage county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar. 14.

478 tons, 1.24 miles of Tri-state route, Northern Illinois toll highway contract T-3B, including erection of precast concrete bridges, Worth and Palos townships, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar. 21.

400 tons, Washington state, four bridges, Spokane county; bids to Olympia, Wash., Mar. 12.

380 tons, Washington state, two highway spans, Thurston county; bids to Olympia, Wash., Mar. 12.

327 tons, state bridges, Lehigh county, Pa.; readvertised for Mar. 22; also required are 724 tons of structurals.

280 tons, Northern Illinois tool highway contract N-4D, including erection of precast concrete bridges, Dundee and Elgin townships, Kane county, Ill., for Illinois State Toll Highway Commission, Chicago; bids March 7.

220 tons, Washington state, overcrossing, Whatcom county; bids to Olympia, Wash., Mar. 12.

210 tons, Washington state, four slab spans, Clark county; bids to Olympia, Wash., Mar. 12.

145 tons, Washington state, overcrossing, King county; Northwest Construction Co., Seattle, is low and awarded at $828,246.

100 tons, Washington state, overcrossing, Thurston county; general award to J. E. Alexander, Seattle, low at $119,965.

PLATES . . .

PLATES PLACED

2000 tons, plant expansion at Washington and Oregon terminals, Union Oil Co., to unstated interest.

100 tons, 250,000-gal elevated water tank, Corps of Engineers, Walla Walla, Wash., to the Chicago Bridge & Iron Co., Chicago.

Atchison, Topeka & Santa Fe, 15 stainless steel baggage cars, to the Budd Co., Philadelphia.

PLATES PENDING

500 tons, Air Force depot, Topeka, Kans.; Feb. 19 bids.

250 tons, fuel storage, etc., Helena Valley project; rebids to the Bureau of Reclamation, Canyon Ferry, Mont., Feb. 26.

100 tons, 100,000-gal steel standpipe, Woodstock, N. Y.; bids Mar. 4, to the town supervisor.

100 tons, fuel storage, including two 10,000-bbl underground tanks, Naval air station, Memphis, Tenn.; bids Mar. 19.

Argentine government-owned enterprise, Transportes De Buenos Aires, 112 subway coaches for operation in Buenos Aires; bids asked.

Transportation Supply & Maintenance Company, Army, St. Louis, 25 fifty-ton welded hopper cars; bids March 4.

PIPE . . .

STEEL PIPE PENDING

Unstated, 1950 ft of 4-in. standard, and 53,375 ft of 6 to 12-in. welded steel for Michaud Flats, Idaho, project; bids early in March to the Bureau of Reclamation, Denver.

CAST IRON PIPE PLACED

200 tons, 16 in. for system expansion, Tacoma, Wash., to the Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

180 tons, 6 to 16 in.; bids to Port Angeles, Wash., Mar. 5.

STEEL PIPE PLACED

134 tons, system expansion, Longview, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

Steel Prices

Mill prices as reported to STEEL, Feb. 27, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following Mill points indicate producing company. Key to producers, page 162; to footnotes, page 164.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bessemer,Pa. U5 .....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 .....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$91.50
Bridgeport,Conn. N19 .96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$107.00
Bridgeport,Conn. N19. 107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ...107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14.111.50
S.Duquesne,Pa. U5 ...111.50

SKELP

Aliquippa,Pa. J5 .....4.725
LoneStar,Tex. L6 .....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ...4.625

WIRE RODS

AlabamaCity,Ala. R2 ...5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 .....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P7 .....5.80
N.Tonawanda,N.Y. B11.5.80
Pittsburg,Calif. C11 ....6.60
Portsmouth,O. P12 .....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.25
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 .....5.85
Portland,Oreg. O4 .....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14..5.00
S.SanFrancisco B3 .....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 .....5.00

Wide Flange

Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2..5.25
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1..7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 .....7.45
Lackawanna,N.Y. B2 ...7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 .....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ...7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ...5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ...4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ...4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 .....5.05
Harrisburg,Pa. P4 .....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1..4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....6.20
Fontana,Calif. K1 .....6.75
Geneva,Utah C11 .....6.00
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 .....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1.7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 .....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14...6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ....5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10...5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)

Ala.City,Ala.(9) R2 ...5.075
Aliquippa,Pa.(9) J5 ...5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ...5.325
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa. U5 .....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ...5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Geneva,Utah(9) C11 ....5.175
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ....5.525
Niles,Calif. P1 .....5.85
N.T'wanda,N.Y.(9) B11 5.075
Pittsburg,Calif.(9) C11..5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.85
Seattle B3, N14 .....5.825
S.Ch'g'o(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 .5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif.(9) C11..5.775
Youngstown(9) R2, U5 5.075

BARS, H.R. Leaded Alloy
(Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2,Y1.6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 .....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 ....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. S5 .....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14..7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Houston S5 .....5.325
KansasCity,Mo. S5 ....5.325
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.575
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 .....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F. Leaded Alloy
(Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
Los Angeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2.6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ...7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5....6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13.6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ....6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19.6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 ....8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ...8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ...8.625
Youngstown F3, Y1 ...8.325

BARS, Reinforcing
(To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.575
Birmingham C15 .....5.325
Bridgeport,Conn. N19 ..5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ....5.85

Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225
Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2..5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2.6.73
KansasCity,Mo. S5 .....7.00
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ...6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.075
ChicagoHts.(4) I-2 .....6.10
ChicagoHts.(4) C2 .....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 .....5.10
Franklin,Pa.(4) F5 .....6.10
JerseyShore,Pa.(4) J8 ..5.50
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 .....6.15
Williamsport,Pa.(3) S19.5.65

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14, 16.80
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.06
McK.Rks.(Staybolt) L5.19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3 ...4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ...4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ...5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ...4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ...6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ...5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2...5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 .....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ...8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill.G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Irvin,Pa. U5	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 ....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman & Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.925
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5 Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	*8.90*
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	*9.20*	*10.40*	*12.60*	*15.60*	*18.55*
Boston T6	*9.20*	*10.40*	*12.60*	*15.60*	*18.55*
Bristol,Conn. W1	...	*10.40*	*12.60*	*15.60*	*18.55*
Carnegie,Pa. S18	*8.65*	*10.10*	*12.30*	*15.30*	...
Cleveland A7	*8.65*	*10.10*	*12.30*	*15.30*	*18.25*
Cleveland C7	...	9.80	12.00	15.00	17.95
Dover,O. G6	7.95	9.80	12.00	15.00	17.95
Detroit D2	8.75	10.20	12.40	15.40	....
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
FranklinPark,Ill. T6	*8.75*	*10.10*	*12.30*	*15.30*	*18.25*
Harrison,N.J. C18	...	...	12.30	15.30	18.25
Indianapolis C8	8.10	9.95	12.00	15.00	17.95
Los Angeles C1	*10.85*	*12.30*	*14.50*	....	....
NewBritain,Conn.(10) S15	7.95	9.80	12.00	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.00	15.00	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	7.95	9.80	12.00	15.00	....
NewYork W3	...	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	*9.20*	*10.40*	*12.60*	*15.60*	*18.55*
Riverdale,Ill. A1	*8.75*	*10.10*	*12.30*	*15.30*	*18.25*
Rome,N.Y.(32) R6	*8.65*	*10.10*	*12.30*	*15.30*	*18.25*
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	*10.40*	*12.60*	*15.60*	*18.55*
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	7.95	9.80	12.00	15.00	17.95
Worcester,Mass. A7, T6	*9.20*	*10.40*	*12.00*	*15.60*	*18.55*
Youngstown C8	7.95	9.80	12.00	15.00	17.95

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	*17.10*	*20.95*	*25.30*
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	17.10	20.95	25.30
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	*17.10*	*20.95*	*25.30*
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Irvin,Pa. U5	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING

Black Plate (29 Gage)	
Aliquippa,Pa. J5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Irvin,Pa. U5	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES

(Special Coated; Base Box)	
Gary,Ind. U5	$9.20
Irvin,Pa. U5	9.20

ROOFING SHORT TERNES

(8 lb Coated; Base Box)	
Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Cleveland A7	*11.90*
Donora,Pa. A7	*11.90*
Duluth A7	*11.90*
Johnstown,Pa. B2	*11.90*
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
NewHaven,Conn. A7	*12.20*
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	*11.90*
Roebling,N.J. R5	*12.20*
SparrowsPt.,Md. B2	*12.00*
Struthers,O. Y1	11.75
Trenton,N.J. A7	*12.20*
Waukegan,Ill. A7	*11.90*
Worcester,Mass. A7	*12.20*

ROPE WIRE	(A)
Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	*12.00*
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	*8.70*
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	8.70
KansasCity,Mo. S5	8.65
LosAngeles B3	9.65
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	*8.70*
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.70
S.SanFrancisco C10	9.35
SparrowsPt.,Md. B2	8.80
Struthers,O. Y1	8.40
Trenton, N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MS Spring, High Carbon

Aliquippa,Pa. J5	*9.025*
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	8.775
Johnstown,Pa. B2	9.025
LosAngeles B3	9.975
Milbury,Mass.(12) N6	*9.325*
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	9.025
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	9.025
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	9.125
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6	9.025
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	14.15
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	....15.25
Monessen,Pa. P16	....15.45
Roebling,N.J. R5	....15.60

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....10.75
Baltimore T6	.....11.05
Boston T6	.....11.05
Buffalo W12	.....10.75
Cleveland A7	.....10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	.....10.75
Fostoria,O. S1	.....10.75
FranklinPark,Ill. T6	..10.85
Kokomo,Ind. C16	....10.75
Massillon,O. R8	.....10.75
Milwaukee C23	.....10.95
Monessen,Pa. P7, P16	.10.75
NewKensington,Pa. A6	.10.75
Palmer,Mass. W12	....11.05
Pawtucket,R.I. N8	....11.05
Riverdale,Ill. A1	.....10.85
Rome,N.Y. R6	.....10.75
Trenton,N.J. R5	.....11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	..164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla. (20) M8	.175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (7) N15	166
Worcester,Mass. A7	...170

NAILS, Stock

	Col.
Chicago W13	164
Cleveland A9	170

(To Wholesalers; per cwt)

Galveston,Tex. D7	....$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	..9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	..$9.53
Atlanta A11	.....9.63
Bartonville,Ill. K4	....9.63
Buffalo W12	.....10.05
Chicago W13	.....9.53
Crawfordsville,Ind. M8	..9.63
Donora,Pa. A7	.....9.53
Duluth A7	.....9.53
Fairfield,Ala. T2	.....9.53
Houston S5	.....9.78
Jack'ville,Fla. M8	....10.09
Johnstown,Pa. B2	....9.53
Joliet,Ill. A7	.....9.53
KansasCity,Mo. S5	....9.78
Kokomo,Ind. C16	.....9.63
LosAngeles B3	.....10.32
Minnequa,Colo. C10	....9.78
Pittsburg,Calif. C11	...10.31
S.Chicago,Ill. R2	.....9.53
S.SanFrancisco C10	...10.31
SparrowsPt.,Md. B2	....9.63
Sterling,Ill.(37) N15	....9.63

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	.$9.85
Atlanta A11	.....9.95
Bartonville,Ill. K4	.....9.95
Buffalo W12	.....10.35
Chicago W13	.....9.85
Crawfordsville,Ind. M8	.9.95
Donora,Pa. A7	.....9.85
Duluth A7	.....9.85
Fairfield,Ala. T2	.....9.85
Houston S5	.....10.10
Jacksonville,Fla. M8	...10.41
Johnstown,Pa. B2	....9.85
Joliet,Ill. A7	.....9.85
KansasCity,Mo. S5	....10.10
Kokomo,Ind. C16	.....9.95
LosAngeles B3	.....10.65
Minnequa,Colo. C10	....10.10
Pittsburg,Calif. C11	...10.65
S.Chicago,Ill. R2	.....9.85
S.SanFrancisco C10	..10.65
SparrowsPt.,Md. B2	...9.95
Sterling,Ill.(37) N15	....9.95

Coil Interim	
AlabamaCity,Ala. R2	.$9.90
Atlanta A11	.....10.00
Bartonville,Ill. K4	....10.00
Buffalo W12	.....10.40
Chicago W13	.....9.90
Crawfordsville,Ind. M8	.10.00
Donora,Pa. A7	.....9.90
Duluth A7	.....9.90
Fairfield,Ala. T2	.....9.91
Houston S5	.....10.15
Jacksonville,Fla. M8	..10.46
Johnstown,Pa. B2	....9.90
Joliet,Ill. A7	.....9.90
KansasCity,Mo. S5	....10.15
Kokomo,Ind. C16	....10.00
LosAngeles B3	.....10.70
Minnequa,Colo. C10	....10.15
Pittsburg,Calif. C11	...10.70
S.Chicago,Ill. R2	.....9.90
S.SanFrancisco C10	....10.70
SparrowsPt.,Md. B2	....10.00
Sterling,Ill.(37) N15	....10.00

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	..184**
Aliquippa,Pa. J5	.....181§
Atlanta A11	.....190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	..190
Donora,Pa. A7	.....184†
Duluth A7	.....184†
Fairfield,Ala. T2	.....184†
Houston,Tex. S5	.....189**
Jacksonville,Fla. M8	...195
Johnstown,Pa. B2	....188*
Joliet,Ill. A7	.....184†
KansasCity,Mo. S5	....189**
Kokomo,Ind. C16	.....186†
Minnequa,Colo. C10	....189**
Monessen,Pa. P7	.....188*
Pittsburg,Calif. C11	...204†
Rankin,Pa. A7	.....184†
S.Chicago,Ill. R2	.....184**
S.SanFrancisco C10	...204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	....190*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.....176**
Aliq'ppa,Pa. 9-14½ga.J5	179§
Atlanta A11	.....182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	..182
Donora,Pa. A7	.....176†
Duluth A7	.....176†
Fairfield,Ala. T2	.....176†
Houston,Tex. S5	....181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	..180*
Joliet,Ill. A7	.....176†
KansasCity,Mo. S5	..181**
Kokomo,Ind. C16	.....178†
Minnequa,Colo. C10	..181**
Monessen,Pa. 9 ga. P7	..180*
Pittsburg,Calif. C11	..199†
Rankin,Pa. A7	.....176†
S.Chicago,Ill. R2	....176**
Sterling,Ill.(7) N15	....182*

	An'ld	Galv.
WIRE (16 gage)	**Stone**	**Stone**
Ala.City,Ala.R2	15.70	17.25**
Aliq'ppa,Pa. J5	..15.70	17.50
Bartonville K4	..15.80	17.75
Buffalo W12	....16.10	....
Cleveland A7	....15.70	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	...16.20	17.75†
Houston S5	...15.95	17.50**
Jacksonville M8	..16.05	18.00
Johnstown B2	..15.70	17.65*
Kan.City,Mo. S5	15.95	....
Kokomo C16	..15.80	17.35†
Minnequa C10	.16.05	17.75**
P'im'r,Mass.W2	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt.	B2.15.80	17.75*
Sterling(37)	N15 15.80	17.75*
Waukegan A7	..15.70	17.25†
Worcester A7	....16.00	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	....7.95	8.475§
Atlanta (48) A11	8.05	8.65*
Bartonville(48)	K4.8.05	8.65
Buffalo W12	....8.10	8.50**
Cleveland A7	....7.95	....
Crawfordsville M8	.8.05	8.65
Donora,Pa. A7	..7.95	8.35†
Duluth A7	.....7.95	8.35†
Fairfield T2	.....7.95	8.35†
Houston(48) S5	.8.20	8.60**
Jacks'ville,Fla.	M8 8.30	8.90
Johnstown B2(48)	7.95	8.55*
Joliet,Ill. A7	....7.95	8.35†
Kans.City(48)	S5 8.20	8.60**
Kokomo C16	....8.05	8.45†
LosAngeles B3	....8.90	9.50**
Minnequa C10	..8.20	8.60**
Monessen P7 (48)	7.95	8.55*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	.8.90	9.30†
Rankin,Pa. A7	...7.95	8.35†
S.Chicago R2	...7.95	8.35**
S.SanFran. C10	.8.90	9.30**
Spar'wsPt. B2(48)	8.05	8.65*
Sterling(37)(48)	N15 8.05	8.65*
Struth'rs,O.(48)	Y1 7.95	8.45‡
Worcester,Mass.A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	..190
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston S5	195
Jacksonville,Fla. M8	...197
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo. C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
Sterling,Ill.(7) N15	192
SparrowsPoint,Md. B2	..192
Tonawanda,N.Y. B12	...169
Williamsport,Pa. S19	...175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	..169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill.(1) N15	167
Tonawanda,N.Y. B12	...169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter..	55
Longer than 6 in. ..	46.5
⅝ in. thru 1 in.:	
6 in. and shorter ..	46.5
Longer than 6 in. ..	44
1⅛ in. and larger:	
All lengths	44

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter ..	55

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in and smaller:	
6 in. and shorter ..	35
Longer than 6 in. ..	23
⅝ in. thru 1 in.:	
6 in. and shorter ..	20
Longer than 6 in. ..	20
1⅛ in. and larger:	
All lengths	20

Lag Bolts

All diameters:	
6 in. and shorter	55
Longer than 6 in. ..	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	54
Larger than ½ in. or longer than 6 in.	47
Blank Bolts	47
Step, Elevator, Tire Bolts	54

NUTS

Reg. & Heavy Square Nuts:	
All sizes	59
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	45

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller .	63
⅞ in. to 1 in., incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger..	58

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller..	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger .	58

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller..	50
⅞ in. to 1 in., incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

¾ in. and smaller..	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger ..	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller ..	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger..	58

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller..	47
¾, ⅞ and 1 in. diam.	31

Longer than 6 in.:

⅝ in. and smaller..	18.5
¾, ⅞ and 1 in. diam.	5.5

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller..	34
¾, ⅞ and 1 in. diam.	13

Longer than 6 in.:

⅝ in. and smaller.	+1
¾, ⅞ and 1 in. diam.	+19

Fillister Head, Coarse Thread:

Listed Sizes	+31

Flat Head, Coarse Thread:

¼ in. and smaller by 6 in. and shorter..	+57

Set Screws, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter ..	11
Longer than 6 in. ..	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 11.50
⅞-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	22.84
1¼	13	....	29.07	22.68
1½	13	27.45	32.14	25.08
1¾	13	32.43	37.97	29.64
2	13	36.34	42.56	33.21
2¼	13	40.93	47.94	37.42
2¼	12	44.42	52.03	40.61
2½	12	48.94	57.31	44.73
2¾	12	52.99	62.05	48.44
3	12	56.51	66.18	51.66

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	...
Huntington,W.Va. C15	....	....	....	6.00
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	...
Johnstown,Pa. B2	....	....	....	*(16)6.25*
Lackawanna,N.Y. B2	*5.275*	*5.175*	....	*6.25*
Minnequa,Colo. C10	.....	4.975	....	6.50
Steelton,Pa. B2	*5.275*	*5.175*	....	...
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	.....6.025
Gary,Ind. U5	.....6.025
Ind.Harbor,Ind. I-2	....6.025
Lackawanna,N.Y. B2	...*6.275*
Minnequa,Colo. C10	....6.025
Seattle B3	.....6.175
Steelton,Pa. B2	.....*6.275*
Torrance,Calif. C11	...6.175

JOINT BARS

Bessemer,Pa. U5	.....6.35
Fairfield,Ala. T2	.....6.35
Ind.Harbor,Ind. I-2	....6.35
Joliet,Ill. U5	.....6.35
Lackawanna,N.Y. B2	....*6.60*
Minnequa,Colo. C10	...6.35
Steelton,Pa. B2	.....*6.60*

AXLES

Ind.Harbor,Ind. S13	....8.35
Johnstown,Pa. B2	.....8.35

TRACK BOLTS, Untreated

Cleveland R2	.....13.10
KansasCity,Mo. S5	....13.10
Lebanon,Pa. B2	.....*13.85*
Minnequa,Colo. C10	...13.10
Pittsburgh P14	.....13.10
Seattle B3	.....13.60

SCREW SPIKES

Cleveland R2	.....12.85
Pittsburgh P14	.....12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....8.775
Ind.Harbor,Ind. I-2, Y1	.8.775
KansasCity,Mo. S5	....8.775
Lebanon,Pa. B2	.....*9.225*
Minnequa,Colo. C10	....8.775
Pittsburgh J5	.....8.775
Seattle B3	.....9.275
S.Chicago,Ill. R2	.....8.775
Struthers,O. Y1	.....8.775
Youngstown R2	.....8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 5/16" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over 5/8-in.; 7.30c, for widths 5/8-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.5	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+2.75	+20.75	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.5	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	6.25	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Younstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.50	40.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.96	65.46	65.46	65.96
Muskegon,Mich., deld.	....	76.83	76.83	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.62	66.12	66.12	66.62
Mid-Atlantic District				
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
New York, deld	....	71.20	71.70	....
Newark,N.J., deld.	68.52	69.02	69.52	70.02
Philadelphia, deld.	66.38	66.88	67.38	67.88
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks,Pa., deld	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa. deld...	....	64.76	64.76	65.29
Vernoa, Trafford, Pa. deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa. deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	64.50	65.00	65.50	....
Fontana,Calif. K1	70.50	71.00	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex, L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	69.04	69.54	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	78.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	....	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	10.71	14.49	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.25	8.70	14.35	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	....	....	8.44	8.40	10.26
Chicago	7.80	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.55	11.09	12.41	....	9.70	9.75	10.54	18.89	9.60	9.50	11.15
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.21	8.74	8.51	9.74
Erie, Pa.	7.75	8.88	9.60[10]	....	7.90	8.00	8.70[10]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	....	....	8.54	8.50	10.34
Los Angeles	9.10	10.80	11.65	....	9.15	8.80	11.70	15.35	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	8.70	....	7.78	8.36	...
New York	8.45	9.66	10.23	60.20	8.90	9.01	10.65	14.39	8.91	9.01	10.31
Norfolk, Va.	8.05	...	...	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.71	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	8.07	7.91	8.60	13.95	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	....	11.05‡‡	8.95	13.55	14.60	9.35	12.20§§	11.60
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	....	8.43	8.28	8.96	14.41	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	9.21	....	8.94	8.90	9.87
San Francisco	8.95	10.30	10.80	....	8.95	8.80	12.30	15.35	9.05	9.20	11.45
Seattle	9.55	10.70	11.65	....	9.50	9.30	13.30	15.65	9.35	9.30	11.40
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.30	13.30	16.40	9.35	9.30	11.40
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **¼-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

(Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $239.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅜-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$27.00-28.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.65-3.75

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	26.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	36.20
Ton lots	37.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.05
Nickel-Silver, 5000-lb lots	56.10-60.10†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.05
Stainless Steel, 316	$1.40
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 2000 mesh:	
1000 lb and over	4.20
Less than 1000 lb.	4.35
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	30.00
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.75	7.75	7.75	8.15
Plates (basic bessemer)	9.30	9.30	9.30	9.70
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.80	6.80	6.80	7.25
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.57

Oil Country Pipe: Mills withdrawn temporarily.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $255, Johnstown, Duquesne, Sheridan, Pa., Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 13.8c per lb of alloy. Packed, c.l. 15c, ton 15.45c, less ton 16.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.9c per lb of contained Si. Packed c.l. 16.4c, ton lot 17.85c, less ton 19.5c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (16-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c, less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet, packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.15 per lb of contained W; 2000 lb W to 5000 lb W, $3.25; less than 2000 lb W, $3.37. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

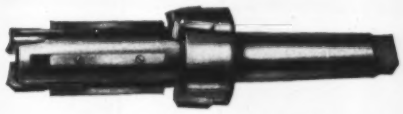
Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

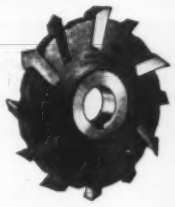
APEX TOOLS

INSERTED-BLADE MILLING CUTTERS STOCKED IN OVER TWENTY TYPES

Special types made promptly to order



(A) END MILL. (B) COMBINATION BORING AND FACING MILL. Botn are made with tapered, serrated blades adjustable to hold diameters. (C) ALTERNATE ANGLE CUTTER. Slots all widths ½" and over, and all diameters 4" and larger. Blades of H. S. Steel, Super Cobalt, Stellite or Carbide Tipped. Write for catalog showing complete line of multiple and single-point tool bits, serrated or round shank.



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famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

THE EASTERN MACHINE SCREW CORP., 22-42 Barclay Street, New Haven, Conn.
Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

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SAND OR SHELL MOLDED

"C" Steel Castings—sand or shell molded—possess qualities far more interesting than the mere strength of steel. For, in addition to strength they provide more efficient design—better weight-strength ratio—and greater fatigue resistance, i.e., longer life and less replacement. Furthermore "C" Steel Castings, because they are truly foundry engineered from pattern to final casting, require minimum machining and provide better fit plus fast assembly.

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COST JUST A FRACTION OF METAL SPACERS

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Scrap Prices Are Still Slipping

STEEL's index on the prime grade falls another 33 cents to $52.50 but market's tone is firmer. Export licensing temporarily halted. Effect of suspension not immediately reflected

Scrap Prices, Page 172

Washington—The Department of Commerce has temporarily delayed the issuance of export licenses for scrap iron to Japan, Great Britain and the six-nation European Coal & Steel Community. The action means a temporary freeze on new licenses. Shipments on old licenses extend through April, it is said.

The holding action was taken to enable the government to take a "fresh" look at the scrap export problem. A recent Commerce Department study recommended a slowdown in exports.

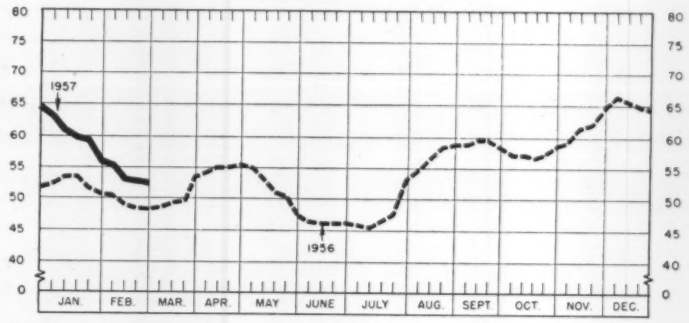
Philadelphia — Purchase last week of a tonnage of prime open-hearth scrap by U.S. Steel for its Fairless Works at $57, delivered, narrows the range on No. 1 heavy melting, No. 1 bundles and No. 1 busheling to $56.$57, delivered, compared with $56-$58 previously.

No. 2 heavy melting steel is unchanged at $48-$48.50, but No. 2 bundles are easier at $46-$47. Electric furnace bundles are off $1, now $60, delivered, and rail crops (2 ft and under) are down slightly to $78-80. All other grades are unchanged.

Temporary suspension of scrap export licenses is having little bearing on shipments. Licenses already issued had three months to

STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL



Feb. 27 1957	Week Ago	Month Ago	Year Ago	Jan. Avg.
$52.50	$52.83	$56.00	$48.17	$58.96

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run and are effective through March and April. Government officials are considering the proper basis for resumption. A decision is expected shortly. Some shippers believe there will be a restriction in quality rather than quantity. It would mean a curtailment in the movement of prime grades of open hearth scrap.

New York—Apart from a $2 reduction in low phos scrap prices to $55-$56, brokers' buying prices here are unchanged. Trading is slow. This applies to export as well as domestic because a tugboat strike is hampering shipments abroad despite settlement of the longshoremen's strike.

Boston—Steel scrap prices are stabilized, pending the next buying move which is expected shortly. The bulk of broker buying is against old orders, mostly for eastern Pennsylvania delivery. Foundries are ordering close to their requirements. No. 1 machinery cast is slightly firmer.

Detroit—Automotive lists indicate that scrap prices here are off $2 to $3 a ton on the open-hearth grades. The foundry grades continue in strong demand, with prices unchanged.

Pittsburgh—A major consumer plans to enter the market to determine whether the price decline has run its course. Brokers are having difficulty filling orders for No. 1 heavy melting at $54 and the latest order for No. 2 bundles, at $46. Scrap collections have slowed. Sales of scrap have been meager the past month, with the result observers predict a further decline of $2 to $3 in event of a major buy.

Chicago — A few important grades of steel scrap settled $1 or $2 a ton lower last week, but, generally, the market was unchanged. A leading mill announced its buying prices for the next month would be $50 for No. 1 industrial heavy melting (same price other mills are paying) and $51 for No. 1 factory bundles, a drop of $2 below the current market.

In transactions the past week, No. 1 dealer heavy melting steel, No. 1 dealer bundles and rerolling rails have moved at $1 a ton below prices prevailing the previous week. Blast furnace, foundry and railroad grades are unchanged.

Buffalo—Dealers expect cuts of $2 to $4 a ton on the leading steel grades of scrap when March delivery contracts are placed. The mills are reported talking in terms of $2 to $4 under prices last paid here to bring the Buffalo market in line with prices quoted at other scrap consuming centers.

Cast scrap is off $1 a ton here on a sale of cupola grade at $47. Other specialty grades are unchanged.

(*Please turn to page* 177)

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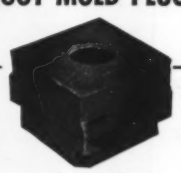

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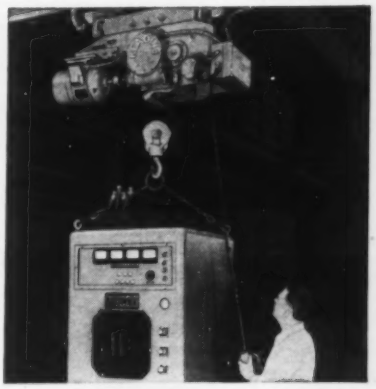

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Feb. 27, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 27	$52.50
Feb. 20	52.83
Jan. Avg.	58.96
Feb. 1956	48.96
Feb. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	53.00-54.00
No. 2 bundles	*45.00-46.00*
No. 1 busheling	53.00-54.00
Machine shop turnings	39.00-40.00
Mixed borings, turnings	39.00-40.00
Short shovel turnings	43.00-44.00
Cast iron borings	43.00-44.00
Cut structurals, 3 ft. lengths	57.00-58.00
Cut structurals, 2 ft. and under	59.00-60.00
Heavy turnings	48.00-49.00
Punchings & plate scrap	57.00-58.00
Electric furnace bundles	57.00-58.00

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Heavy breakable cast	*47.00-48.00*
Unstripped motor blocks	38.00-39.00
No. 1 machinery cast	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt	*57.00-58.00*
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	*69.00-70.00*
Railroad specialties	*68.00-69.00*

Stainless Steel Scrap

18-8 bundles & solids	500.00-540.00
18-8 turnings	420.00-440.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*45.00-46.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*37.00-38.00*
No. 1 busheling	*50.00-51.00*
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	*34.00-35.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	*34.00-35.00*
Cut foundry steel	*53.00-54.00*
Cut structurals plates 2 ft and under	*58.00-59.00*
Alloy free, short shovel turnings	*38.00-39.00*
Electric furnace bundles	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	*52.00-53.00*
Charging box cast	*41.00-42.00*
Heavy breakable cast	*41.00-42.00*
Stove plate	*48.00-49.00*
Unstripped motor blocks	*34.00-35.00*
Brake shoes	*41.00-42.00*
Clean auto cast	*51.00-52.00*
Burnt cast	*39.00-40.00*
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt	*52.00-53.00*
R.R. malleable	*60.00-61.00*
Rails, 2 ft and under	*75.00-76.00*
Rails, 18 in. and under	*76.00-77.00*
Rails, random lengths	*70.00-71.00*
Cast steel	*63.00-64.00*
Railroad specialties	*66.00-67.00*
Uncut tires	*65.00-66.00*
Angles, splice bars	*65.00-66.00*
Rails, rerolling	*74.00-75.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-475.00
18-8 turnings	290.00-300.00
430 clips, bundles, solids	95.00-100.00
430 turnings	40.00-45.00

YOUNGSTOWN

No. 1 heavy melting	*52.00-53.00*
No. 2 heavy melting	*48.00-49.00*
No. 1 bundles	*52.00-53.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*52.00-53.00*
Machine shop turnings	*33.00-34.00*
Short shovel turnings	*37.00-38.00*
Cast iron borings	*37.00-38.00*
Low phos.	*53.00-54.00*
Electric furnace bundles	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt	*54.00-55.00*

CHICAGO

No. 1 hvy melt, indus.	49.00-50.00
No. 1 hvy melt, dealer	*45.00-46.00*
No. 2 heavy melting	42.00-43.00
No. 1 factory bundles	*50.00-51.00*
No. 1 dealer bundles	*46.00-47.00*
No. 2 bundles	39.00-40.00
No. 1 busheling, indus.	49.00-50.00
No. 1 busheling, dealer	*45.00-46.00*
Machine shop turnings	34.00-35.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft	*54.00-55.00*
Punchings & plate scrap	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	41.00-42.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	50.00-51.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
R.R. malleable	60.00-61.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Angles, splice bars	58.00-59.00
Rails, rerolling	*63.00-64.00*

Stainless Steel Scrap

18-8 bundles & solids	*500.00-510.00*
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	65.00-70.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*42.00-43.00*
Machine shop turnings	*26.00-28.00*
Mixed borings, turnings	*27.00-29.00*
Short shovel turnings	*28.00-29.00*
Punchings & plate scrap	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	51.00
Charging box cast	44.00
Stove plate	45.00
Heavy breakable	44.00
Unstripped motor blocks	32.00
Clean auto cast	55.00
Malleable	56.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*45.50*
No. 2 heavy melting	43.00
No. 1 bundles	*45.50*
No. 2 bundles	*37.00*
No. 1 busheling	*45.50*
Machine shop turnings	34.50
Short shovel turnings	36.50

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	*45.00*
Clean auto cast	*49.50*
Stove plate	41.00

Railroad Scrap

No. 1 R.R. heavy melt	*53.00*
Rails, 18 in. and under	*65.00*
Rails, rerolling	*63.00*
Rails, random lengths	62.00
Angles, splice bars	*64.00*

PHILADELPHIA

No. 1 heavy melting	*56.00-57.00*
No. 2 heavy melting	48.00-48.50
No. 1 bundles	*56.00-57.00*
No. 2 bundles	*46.00-47.00*
No. 1 busheling	*56.00-57.00*
Electric furnace bundles	*60.00*
Mixed borings, turnings	44.00
Short shovel turnings	46.00-47.00
Machine shop turnings	42.00-43.00
Heavy turnings	52.00-54.00†
Structurals & plates	62.00-63.00
Couplers, springs, wheels	69.00-70.00
Rails, crops, 2 ft & under	*78.00-80.00*

Cast Iron Grades

No. 1 cupola	51.00-53.00
Heavy breakable cast	57.00-59.00
Malleable	66.00†
Drop broken machinery	58.00-59.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	43.00-44.00
No. 1 bundles	51.00-52.00
No. 2 bundles	41.00-42.00
Machine shop turnings	33.00-34.00
Mixed borings, turnings	34.00-35.00
Short shovel turnings	36.00-37.00
Low phos. (structural & plate	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Unstripped motor blocks	37.00-38.00
Heavy breakable	48.00-49.00

Stainless Steel

18-8 sheets, clips solids	475.00-485.00
18-8 borings, turnings	345.00-370.00
430 sheets, clips, solids	105.00-110.00
410 sheets, clips, solids	95.00-100.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	47.00-48.00
No. 2 heavy melting	*36.00-36.50*
No. 1 bundles	47.00-48.00
No. 2 bundles	*35.00-35.50*
No. 1 busheling	47.00-48.00
Machine shop turnings	30.00-31.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	*33.00-34.00*
No. 1 cast	41.00-42.00
Mixed cupola cast	40.00-41.00
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	46.00-47.00
No. 1 bundles	53.00-54.00
No. 2 bundles	42.00-43.00
No. 1 busheling	53.00-54.00
Mixed borings, turnings	36.00-37.00
Machine shop turnings	33.00-34.00
Short shovel turnings	37.00-38.00
Cast iron borings	36.00-37.00
Low phos.	55.00-56.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*46.00-47.00*
No. 1 machinery	53.00-54.00

Railroad Scrap

Rails, random lengths	62.00-63.00
Rails, 3 ft and under	67.00-68.00
Railroad specialties	57.00-58.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*47.50-48.50*
No. 2 heavy melting	*40.00-41.00*
No. 1 bundles	*47.50-48.50*
No. 2 bundles	*35.50-36.50*
No. 1 busheling	*47.50-48.50*
Machine shop turnings	34.00-35.00
Mixed borings, turnings	34.00-35.00
Short shovel turnings	36.00-37.00
Cast iron borings	33.50-34.50
Low phos. 18 in.	55.00-56.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	52.00-53.00
Rails, 18 in. and under	73.00-74.00
Rails, random lengths	63.00-64.00

BIRMINGHAM

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	43.00-44.00
No. 2 bundles	31.00-32.00
No. 1 busheling	43.00-44.00
Cast iron borings	26.00-27.00
Short shovel turnings	36.00-37.00
Machine shop turnings	34.00-35.00
Bar crops and plate	55.00-56.00
Structural & plate	54.00-55.00
Electric furnace bundles	50.00-51.00
Electric furnace, 2 ft & under	48.00-49.00

(F.o.b. shipping point)

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Stove plate	*50.00-51.00*
Unstripped motor blocks	42.00-43.00
Charging box cast	40.00-41.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 18-in. and under	66.00-67.00
Rails, rerolling	64.00-65.00
Rails, random lengths	59.00-60.00
Angles, splice bars	58.00-59.00

SEATTLE

No. 1 heavy melting	53.00
No. 2 heavy melting	51.00
No. 1 bundles	51.00
No. 2 bundles	31.00-34.00
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	54.00-56.00
Heavy breakable cast	48.00-50.00
Unstripped motor blocks	43.00-45.00
Stove plate (f.o.b. plant)	42.00-43.00

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	51.00
No. 1 bundles	54.00
No. 2 bundles	36.00
Machine shop turnings	34.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	55.00
No. 2 heavy melting	50.00
No. 1 bundles	54.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	50.00
Drop broken machinery	62.00

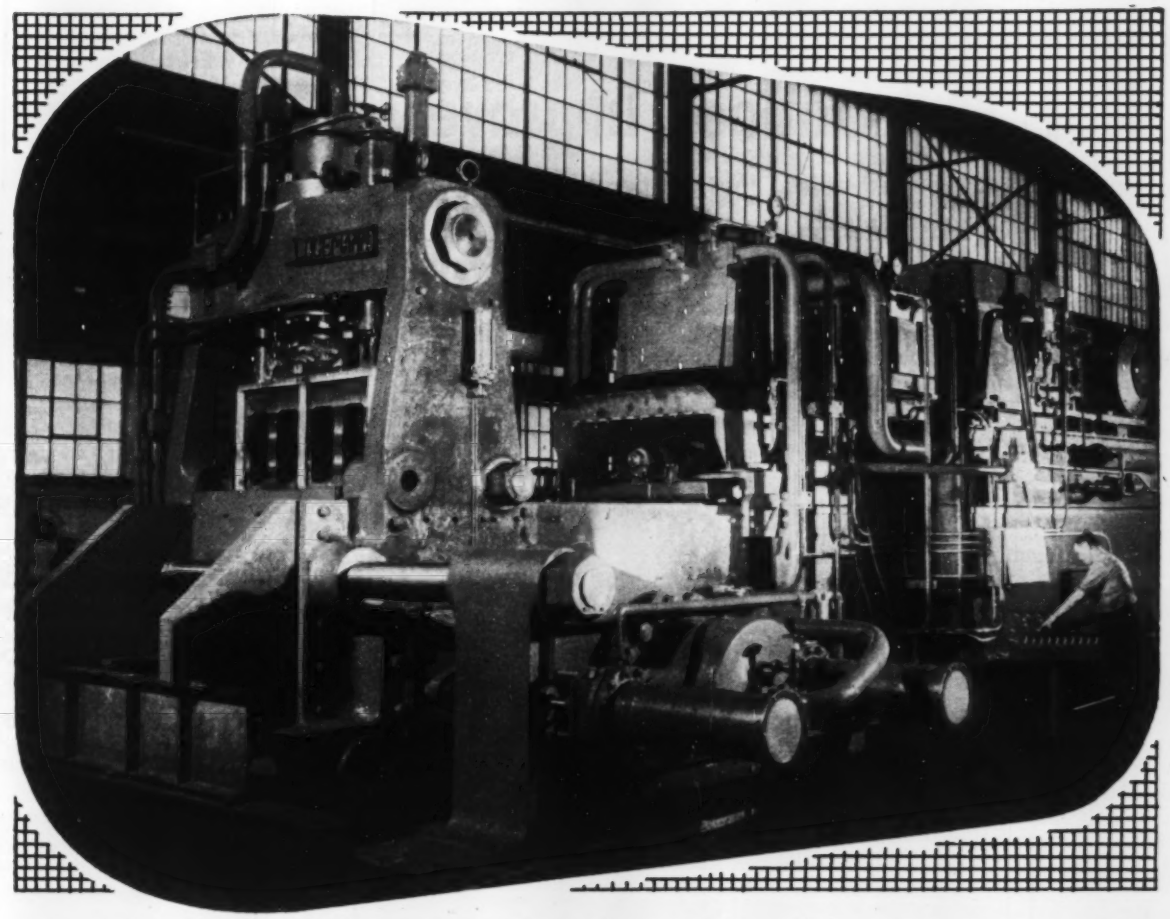
HAMILTON, ONT.

No. 1 heavy melting	50.00
No. 2 heavy melting	44.00
No. 1 bundles	50.00
No. 2 bundles	38.00
Mixed steel scrap	42.00
Busheling, new factory: Prepared	48.00
Unprepared	44.00
Short steel turnings	31.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.



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Brass Mill Outlook Improves

There are growing indications that copper and brass mills should have a good year. Anticipated boost in automotive production will help

Nonferrous Metal Prices, Pages 176 & 177

IT is going to be an extremely competitive year for the brass and copper mill industry, but 1957 sales volume should equal or exceed last year's total.

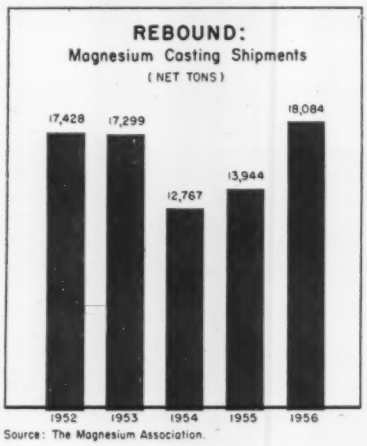
Herman W. Steinkraus, president and chairman, Bridgeport Brass Co., lists some reasons for optimism: 1. Housing starts should be near the 1 million mark. This will bring about a demand for plumbing and heating equipment, builders' hardware, air conditioning apparatus and appliances. (See page 58.) 2. Expansion programs announced show that the electric and gas utilities plan to spend some $6 billion. 3. Petroleum refiners anticipate 1957 capital expenditures to be about $1 billion. 4. The chemical, food and beverage industries are expected to spend another $2.5 billion. 5. Government appropriations for shipbuilding and repairs have been estimated at about $1.5 billion. Result: All these industries will require large tonnages.

Adds Mr. Steinkraus: "Through 1956, particularly in the latter part, our customers greatly reduced inventories. There are indications that most are approaching the end of inventory liquidation and must now rebuild inventories to more realistic levels. We believe that copper prices are gradually reaching a level where reasonable stability may be expected."

Primary producers are quoting 32 cents a pound for the red metal. Custom smelters report improved sales at 31 cents. With automotive production growing, look for optimism to grow throughout the copper industry.

Boost for Tungsten

Four metals—columbium, molybdenum, tantalum and tungsten—will be important in developing alloys for service in temperatures of 1800 to 2000°F. Contends R. H. Thielemann, chairman, Metallurgy Department, Stanford Research Institute: "Tungsten, with its high melting point, modulus of elasticity and recrystallization temperature, appears to be the most promising metal for the extremely high temperature requirements."



Source: The Magnesium Association.

Chrysler Likes Aluminum

Chrysler Corp. claims it is the pioneer in developing new automotive uses for aluminum. It backs up this claim with statistics. Rundown: The Chrysler carries 110 lb; De Soto, 100 lb; Dodge, 70 lb; Plymouth, 80 lb. These figures, reports Chrysler, may vary plus or minus 40 lb depending on the model selected in each car line.

Where it's being used: This year's model offers three distinct types of aluminum grille—perforated, rolled and extruded. Other uses: Curved extruded window frames, anodized sheet aluminum body side trim, hood molding, wheel covers and lead lamp doors and bezels.

Magnesium Rumor

In July, 1954, the government put an electrolytic magnesium smelter in moth balls. Annual capacity: 18,000 tons. Built during the early part of World War II for $14.7 million, the facility could probably be purchased for about $1.4 million. While few have been interested in buying the facility from the General Services Administration, Kaiser Aluminum & Chemical Corp. appears to be studying the pros and cons of purchasing the Painesville, O., plant. Two problems to be studied: 1. Available power supply. 2. Waste water disposal.

Lead, Zinc Sales Up

Both metals are showing some improvement. During the week, the government entered the market for lead and zinc for Apr. 15 delivery to stockpile. It is anticipated that the General Services Administration will take only a small portion of the amount offered.

Zinc diecasters are beginning to

NONFERROUS PRICE RECORD

	Price Feb. 27	Last Change	Previous Price	Jan. Avg.	Dec. Avg.	Feb., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.400
Copper	31.00–32.00	Feb. 19, 1957	31.00–34.00	35.433	35.650	48.076
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	74.000	70.880	64.500
Tin	98.25	Feb. 26, 1957	98.50	101.480	104.465	100.908
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

feel the first effect of increased automotive production. The price remains firm at 13.50 cents per pound. Most producers report lead sales are running slightly ahead of those in the corresponding period last year.

Zirconium: Bigger Markets

K. C. Li, chairman, Wah Chang Corp., points out there will be a growing demand for zirconium from the chemical, electric and electronic fields. Possible growing applications: 1. Use in electrolytic condensers and rectifiers. 2. In powder form for ammunition primers, time fuses for bombs, flashlight powders, flares, fireworks and detonators. 3. As an alloying addition for steel and magnesium.

Market Memos

- Kennecott Copper Corp.'s Chilean mine (Braden) is losing about 25 per cent of its production because of a water shortage. It produces about 16,000 tons of copper each month.
- Look for domestic tin prices to fall to about the 93 cent a pound mark if world production continues at current levels. With the dock strike settled, New York has been flooded with spot tin. Users continue to purchase only enough to cover immediate needs.
- Last year's magnesium casting shipments show a 30 per cent gain over 1955 results, reports the Magnesium Association. Totals: 1956 —18,084; 1955—13,944 tons (see chart, page 174).
- Aluminium Ltd. estimates that there are now some 26,000 companies fabricating aluminum. In 1945, there were only 4500 fabricators.
- Revere Copper & Brass Inc. and Aluminum Co. of America reduced the price of soft alloy extruded aluminum shapes between 5 and 6 per cent, effective Feb. 20 and Feb. 26 respectively.
- The Navy department is preparing specifications for inclusion of magnesium anodes for cathodic protection on its ships. The program will build slowly—small vessels will be equipped first. Test results, say Navy officials, have been excellent, but more data are needed on costs.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.00 deld; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $96-$101 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 98.25; prompt, 98.125.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-2 (0.5% Fe max), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.20 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50 deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.25-28.75; No. 12 foundry alloy (No. 2 grade), 23.00-23.25; 5% silicon alloy, 0.60 Cu max, 24.25-25.50; 13 alloy, 0.60 Cu max, 24.25-25.50; 195 alloy, 24.00-26.25; 108 alloy, 22.00-23.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.75.

Brass Ingot: Red brass No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.00; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 28.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	.....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam., (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)
Aluminum: 1100 clippings, 13.00-13.50; old sheets, 8.00-8.50; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	37.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.08	51.08	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcases, 8.00-8.50; industrial castings, 8.00-8.50.

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 21.50-22.00; light copper, 19.00-19.50; No. 1 composition red brass, 20.00-20.50; No. 1 composition turnings, 19.00-19.50; yellow brass turnings, 12.00-12.25; new brass clippings, 18.50-19.00; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.00-16.50; brass pipe, 16.75-17.25.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 70.00-85.00; old sheets, 65.00-80.00; turnings, 55.00-75.00; rods, 70.00-90.00.

Nickel: Sheets and clips, 140.00-185.00; rolled anodes, 140.00-185.00; turnings, 125.00-160.00; rod ends, 140.00-185.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00-17.50; 3003 clippings, 17.00-17.50; 6151 clippings, 17.00-17.50; 5052 clippings, 16.50-17.50; 2014 clippings, 16.50; 2017 clippings, 16.50; 2024 clippings, 16.50; mixed clippings, 16.00-16.50; old sheets, 14.00-14.50; old cast, 14.00-14.50; clean old cable (free of steel), 16.00-17.50; borings and turnings, 14.00-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 24.75; light copper, 22.50; refinery brass (60% copper) per dry copper content, 23.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 24.75; light copper, 22.50; No. 1 composition borings, 22.00; No. 1 composition solids, 22.50; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 17.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (anhydrous): Less than 25 lb, 167.70; 25 lb, 132.70; 100 lb, 117.70; 400 lb, 115.30; 5200-19,600 lb, 103.10; 20,000 lb, 90.90.

Stannous Sulphate: Less than 50 lb, 130.40; 50 lb, 100.40; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Concluded from page* 171)

Cleveland—The exact level of prices is difficult to determine in the absence of active consumer buying. Auto lists closed at prices $3 to $6 under those paid at the end of January. Three dealers paid $48.50 to $50 for an estimated 15,000 tons.

Mill buying for March has not developed, so that it is impossible to determine at what level new purchases can be made. There is little broker covering, pending clarification of the situation. Brokers have paid down to $49 for material, but a more representative price is considered $50-$51, off $1 from that last paid by the mills. All prices quoted are nominal.

Cincinnati—Prices are off $1 a ton on the open hearth grades of scrap here. No new mill purchases are noted. But brokers are watching closing bids on industrial lists for a clue to the price trend. Cincinnati area steel mill operations are running about 90 per cent for the first time in four weeks.

Seattle—While the scrap market is weak, prices are unchanged with No. 1 heavy melting $53, and No. 2, $51. New prices for March shipments are expected out momentarily. Receipts are about equal to consumption. Exporters continue active and are offering top charter prices for vessels from North Pacific, Atlantic and Gulf ports to Japan.

Youngstown—Scrap is marking time. Dealers are filling comitments, but there is no large surplus of high grade material.

San Francisco — Railroad shipments of scrap into the dock area have been temporarily embargoed. Due to lack of bottoms, scrap is piling up on docks awaiting loading for Japan.

Los Angeles — The scrap iron market here continues soft; further price reductions are anticipated.

Birmingham — No. 1 cast iron scrap dropped $1 a ton last week, but even at the lower figure only one large pipe foundry bought sizable tonnage. The open hearth grades of scrap continue sluggish; little new buying of electric furnace material is noted.

There is only a trickle of scrap moving into dealers' yards. Dealers

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attribute this to lower prices.

The export market is weak. Few vessels are loading at South Atlantic and Gulf ports.

St. Louis — Brokers' buying prices slipped further last week, various grades dropping $1 to $5 a ton. Rails, 18 in. and under, are off $3, and brake shoes $5. Not much dealer scrap is available.

Semifinished Steel . . .

Semifinished Prices, Page 161

Steel production was curtailed at Buffalo last week by a wildcat strike at the Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp. The district ingot rate fell 7 points to 100 per cent of capacity. Three open hearths and two blast furnaces were affected by the walkout.

Pig Iron . . .

Pig Iron Prices, Pages 166

Most consumers of merchant pig iron in New England will have to pay more for the product in the second quarter. The Mystic furnace price will be based on February costs which were higher than in the previous base period.

Melt in the area is steady, although the tonnage being used by the machine tool industry is off slightly from last year's. Shops with mechanized equipment are taking in more outside work. This includes several in the textile mill equipment field.

Demand for gray iron castings in the Chicago district is spotty. Some foundries are on a 40-hour week; others, as low as 30 hours. Sellers of foundry pig iron are shipping all the iron produced, but coke shipments lag.

A strike at three soil pipe shops in the Philadelphia district has slowed the movement of merchant foundry iron there. Demand has been on the lean side for the last few weeks.

Blast furnace production totaled 7,282,373 net tons in January, of which 7,209,547 tons were pig iron and 72,826 tons were ferroalloys, reports the American Iron & Steel Institute. This compares with total production of 7,049,564 tons in January, 1956, of which 6,985,945 tons were pig iron, and 63,619 tons were ferroalloys.

Advertising Index

Abell-Howe Co. 146
Acme-Newport Steel Co. 148
Air Reduction Sales Co., A Division of Air Reduction Co., Inc. 156
Ajax Electrothermic Corporation 36
Alan Wood Steel Co. 107
Aldrich Pump Co., The 113
Alloy Metal Products, Inc. 150
Alloys & Metal Specialties, Inc. 171
American Brake Shoe Co., Denison Engineering Division 45
American Chemical Paint Co. 136
American Pulverizer Co. 88
American Smelting & Refining Co., Federated Metals Division 142, 143
American-Standard, Ross Heat Exchanger Division 24
American Steel & Wire Division, United States Steel Corporation 34, 35
Apex Tool & Cutter Co., Inc. 169
Armco Steel Corporation 50
Armstrong Bros. Tool Co. 137
Armstrong Cork Co. 117
Ashland Oil & Refining Co., Valvoline Oil Co. Division 16
Austenal, Inc., Microcast Division 17

Babcock & Wilcox Co., The, Tubular Products Division ..... Inside Front Cover
Baldwin-Lima-Hamilton Corporation, Loewy-Hydropress Division 39
Basic, Inc. 103
Beatty Machine & Mfg. Co. 145
Bethlehem Steel Co. 1
Bofield Refractories Co. 80
Brad Foote Gear Works, Inc. 82
Brainard Steel Division, Sharon Steel Corporation 79
Browning, Victor R., & Co., Inc. 169
Buffalo Forge Co. 42
Bullard Co., The 130

Cleveland Crane & Engineering Co., The 140
Coles Cranes, Inc. 158
Colorado Fuel & Iron Corporation, The 28, 29, 43
Columbia-Geneva Steel Division, United States Steel Corporation 34, 35
Conco Engineering Works, Division of H. D. Conkey & Co. 87
Cone Automatic Machine Co., Inc. 91
Continental Gin Co., Industrial Division 122
Continental Steel Corporation 10
Coolidge Corporation 73
Crosby Co., The 4
Cross Co., The 8, 9
Crown Zellerbach Corporation, Chemical Products Division 37
Crucible Steel Casting Co. 169
Crucible Steel Company of America 180

Denison Engineering Division, American Brake Shoe Co. 45
Diamond Manufacturing Co. 125
Dixon, Joseph, Crucible Co., The 132
DoAll Co., The 124
Dravo Corporation 114
Dreis & Krump Manufacturing Co. 12
Duraloy Co., The 23
Dykem Co., The 169

Eastern Machine Screw Corporation, The 169
Easton Car & Construction Co. 137
Eaton Manufacturing Co., Dynamatic Division 20
Elwell-Parker Electric Co., The 7
Enthone, Inc. 44
Erie Forge & Steel Corporation 30
Eureka Fire Brick Works 171

Farval Corporation, The ..... Inside Back Cover
Federated Metals Division of American Smelting & Refining Co. 142, 143
Fellows Gear Shaper Co., The 121
Foster, L. B., Co. 177
Frasse, Peter A., & Co., Inc. 13

Garlock Packing Co., The 18, 19
General American Transportation Corporation, Parker-Kalon Division 32
General Motors, New Departure Division 69
General Motors Corporation, Hyatt Bearings Division 66
General Refractories Co. 125
Globe Brick Co., The 152
Globe Steel Abrasive Co., The 141
Green, A. P., Fire Brick Co. 123
Greenlee Bros. & Co. 111

Hansen Manufacturing Co., The 147
Harper, H. M., Co., The 138, 139
Harrington & King Perforating Co., The 81
Herr Equipment Corporation, The 84
Hill Acme Co., The 155
Hobart Brothers Co. 3
Hyatt Bearings Division, General Motors Corporation 66

Industrial Products Suppliers 169
Ingersoll Milling Machine Co., The, Cutter Division 22
International Nickel Co., Inc., The 46

Jomac, Inc. 72
Jones & Laughlin Steel Corporation 77

L & J Press Corporation 153
Lewthwaite, T. H., Machine Co., Inc. 169
Lincoln Electric Co., The 133
Loewy-Hydropress Division, Baldwin-Lima-Hamilton Corporation 39
Logan Co. 110
Logansport Machine Co., Inc. 101
Logemann Brothers Co. 173
Lynchburg Foundry Co. 2

McGill Manufacturing Co., Inc. 92
McGregor-Michigan Corporation 83

Manning, Maxwell & Moore, Inc., Shaw-Box Crane & Hoist Division 109
Microcast Division, Austenal, Inc. 17
Miller, Harry, Corporation 89
Morgan Construction Co. 61
Mundt, Charles, & Sons 134

National-Standard Co. 21
National Steel Corporation 33
New Britain Machine Co., The, New Britain-Gridley Machine Division 25, 26
New Departure, Division of General Motors 69
Niagara Blower Co. 132
Niagara Machine & Tool Works 14, 15

Ohio Steel Foundry Co., The 74
Owen Bucket Co., The 170

Parker-Kalon Division, General American Transportation Corporation 32
Peninsular Steel Co. 85
Peterson Steels, Inc. 178
Porter, H. K., Company, Inc., Riverside-Alloy Metal Division 90
Pratt & Whitney Co., Inc. 112

Reading Crane & Hoist Corporation 171
Reliance Electric & Engineering Co. 38
Republic Steel Corporation 40, 41
Riverside-Alloy Metal Division, H. K. Porter Company, Inc. 90
Roebling's, John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 43
Ross Heat Exchanger Division of American-Standard 24
Rotary Electric Steel Co. 119

Sealmaster Bearings, A Division of Stephens-Adamson Mfg. Co. 31
Seymour Mfg. Co., The 175
Sharon Steel Corporation, Brainard Steel Division 79
Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore, Inc. 109
Silent Hoist & Crane Co. 157
Square D Co. 129
Stamco, Inc. 135
Stephens-Adamson Mfg. Co., Sealmaster Bearings Division 31
Sterling Bolt Co. 108
Sterling Wheelbarrow Co. 144
Superior Tube Co. 86

Tennessee Coal & Iron Division, United States Steel Corporation 34, 35
Thomas Flexible Coupling Co. 154
Timken Roller Bearing Co., The, Steel & Tube Division 70
Torrington Co., The 49

Udylite Corporation, The 120
United States Steel Corporation, Subsidiaries 34, 35
United States Steel Export Co. 34, 35
Upson-Walton Co., The 179

Valvoline Oil Co., Division of Ashland Oil & Refining Co. 16

Walsh Refractories Corporation 6
Warner & Swasey 104
Wean Engineering Co., Inc., The ..... Back Cover
Weirton Steel Co. 33
Wheland Co., The 171
Whiting Corporation 62
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 28, 29
Wisconsin Motor Corporation 144
Wrought Washer Manufacturing Co. 52
Wysong & Miles Co. 11

Youngstown Sheet & Tube Co., The 27

~ ~ ~

Table of Contents, Page 5

Classified Advertising, Page 177

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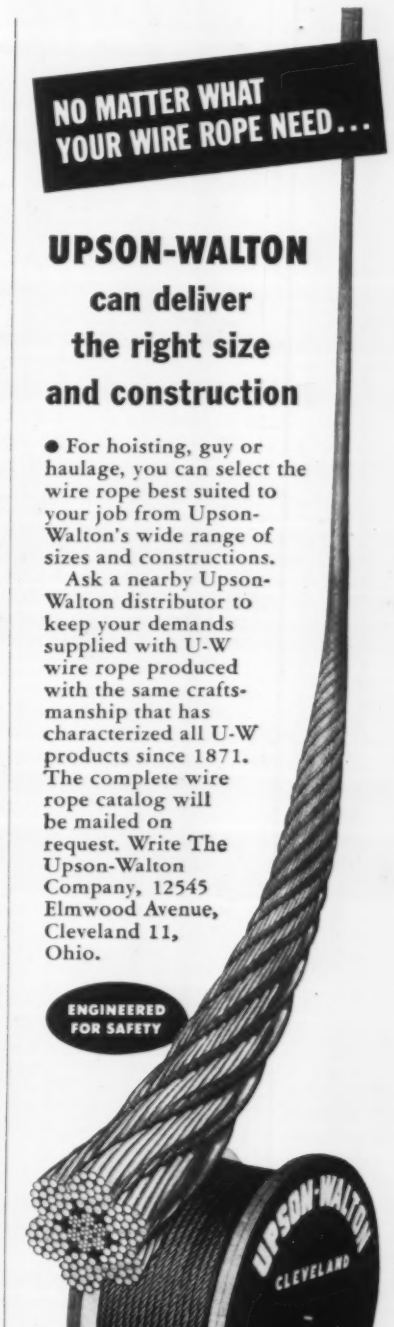
UPSON-WALTON can deliver the right size and construction

● For hoisting, guy or haulage, you can select the wire rope best suited to your job from Upson-Walton's wide range of sizes and constructions.

Ask a nearby Upson-Walton distributor to keep your demands supplied with U-W wire rope produced with the same craftsmanship that has characterized all U-W products since 1871. The complete wire rope catalog will be mailed on request. Write The Upson-Walton Company, 12545 Elmwood Avenue, Cleveland 11, Ohio.



The UPSON-WALTON Company

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Manufactures of WIRE ROPE • ROPE FITTINGS
TACKLE BLOCKS • CRANE HOOK BLOCKS

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Next time you need special steels—call Crucible. You'll find we're *big enough to serve you — small enough to want to.*

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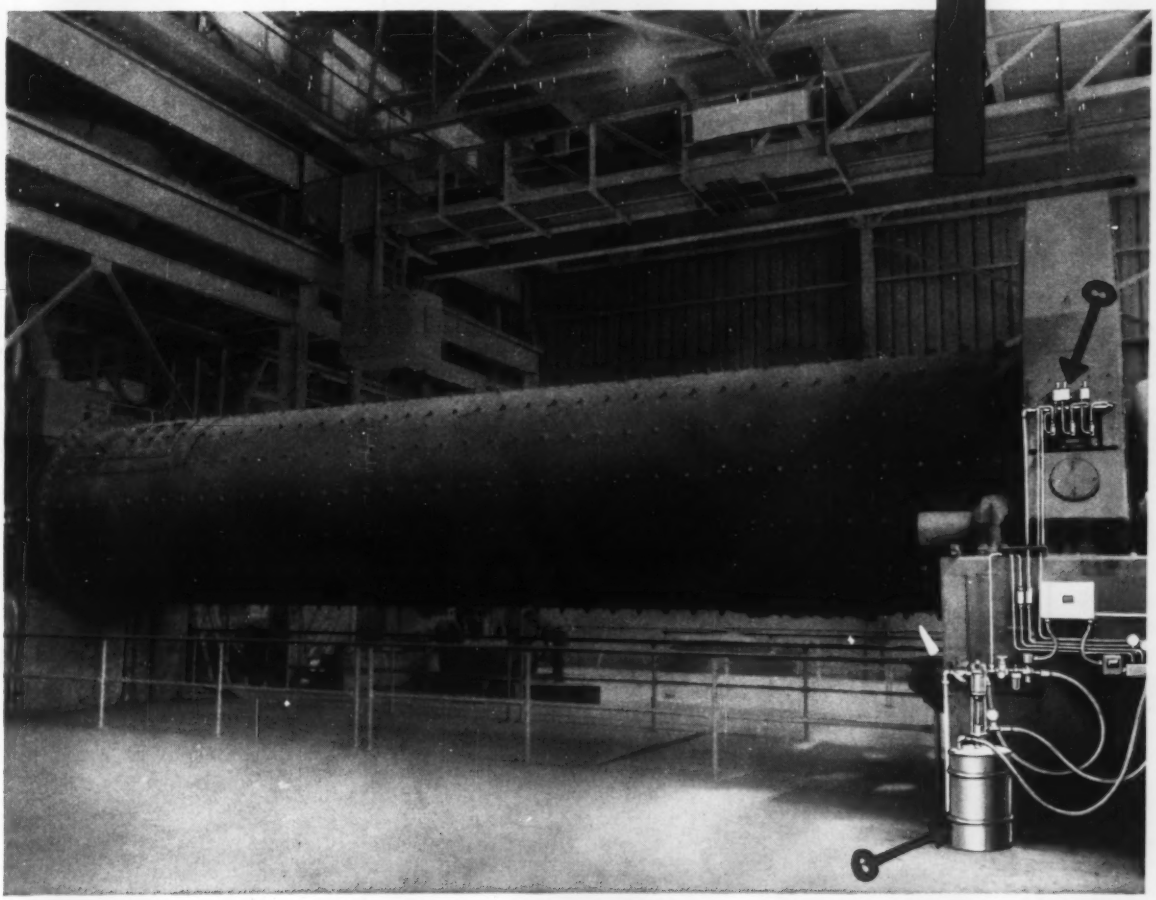
Farval Spray Panel lubricates ball mill at Canada's farthest north cement plant

FARVAL—
Studies in Centralized Lubrication
No. 198



KEYS TO ADEQUATE LUBRICATION—
One of five 2-compartment 8′ x 37′ Allis Chalmers raw mills at Inland Cement Company Limited. Note Farval Automatic Spray Lubrication System at right above. Controlled by a timer, Farval sprays high viscosity grease on gear and pinion every 6 minutes.

● Lubrication of the ball mills for this most northerly cement plant is sure, safe and economical. The main gears and pinions are protected by a Farval system of automatic spray lubrication.

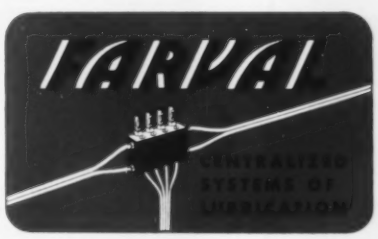
This mill is located in the $12,500,000 cement plant built recently at Edmonton, Canada, and now operating at near capacity to serve the expanding industry centering in Alberta's booming oil fields.

Farval automatic lubrication also is growing—in wider and wider use throughout industry and in ever increasing benefits to users. Hundreds of spray lubrication systems have been installed on gears and sliding surfaces. Millions of bearings are served by Farval manual and automatic systems.

There's a Farval system designed to serve your needs, too. It can save you money 4 ways—in oiling labor, in reduced downtime of equipment, in bearing expense eliminated and in lubricant saved.

Ask us to mail Farval Bulletin 26-R. And a representative will call at your convenience. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm and Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



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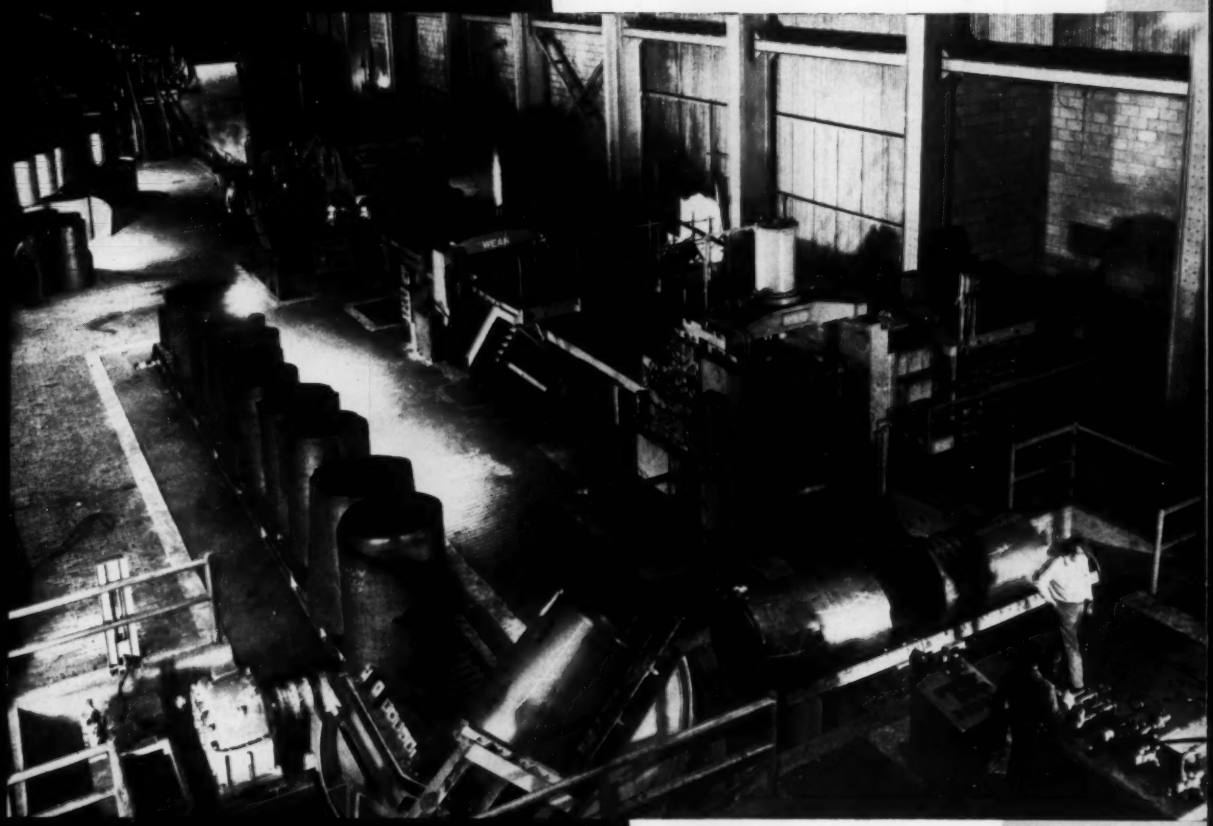
improves continuous
Strip Pickling



FASTER, more uniform pickling at reduced costs — that's why leading steel producers prefer Wean Continuous Strip Pickling Lines. From the McKay Processing Uncoiler to recoiling, the Wean line is engineered to deliver highest quality at greatest speed.

162

WEAN

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO